

No. 11054

IN THE

# United States Circuit Court of Appeals

FOR THE NINTH CIRCUIT

---

INTERNATIONAL CARBONIC ENGINEERING  
COMPANY,

Appellant,

vs.

NATURAL CARBONIC PRODUCTS, INC., a corporation,  
GEORGE PEPPERDINE FOUNDATION, a corporation,  
L. H. POLDERMAN, W. L. BENSON and C. B. BENSON,  
individually and as a copartnership doing business under the fictitious firm name and style of Natural Carbonic Products,

Appellees.

---

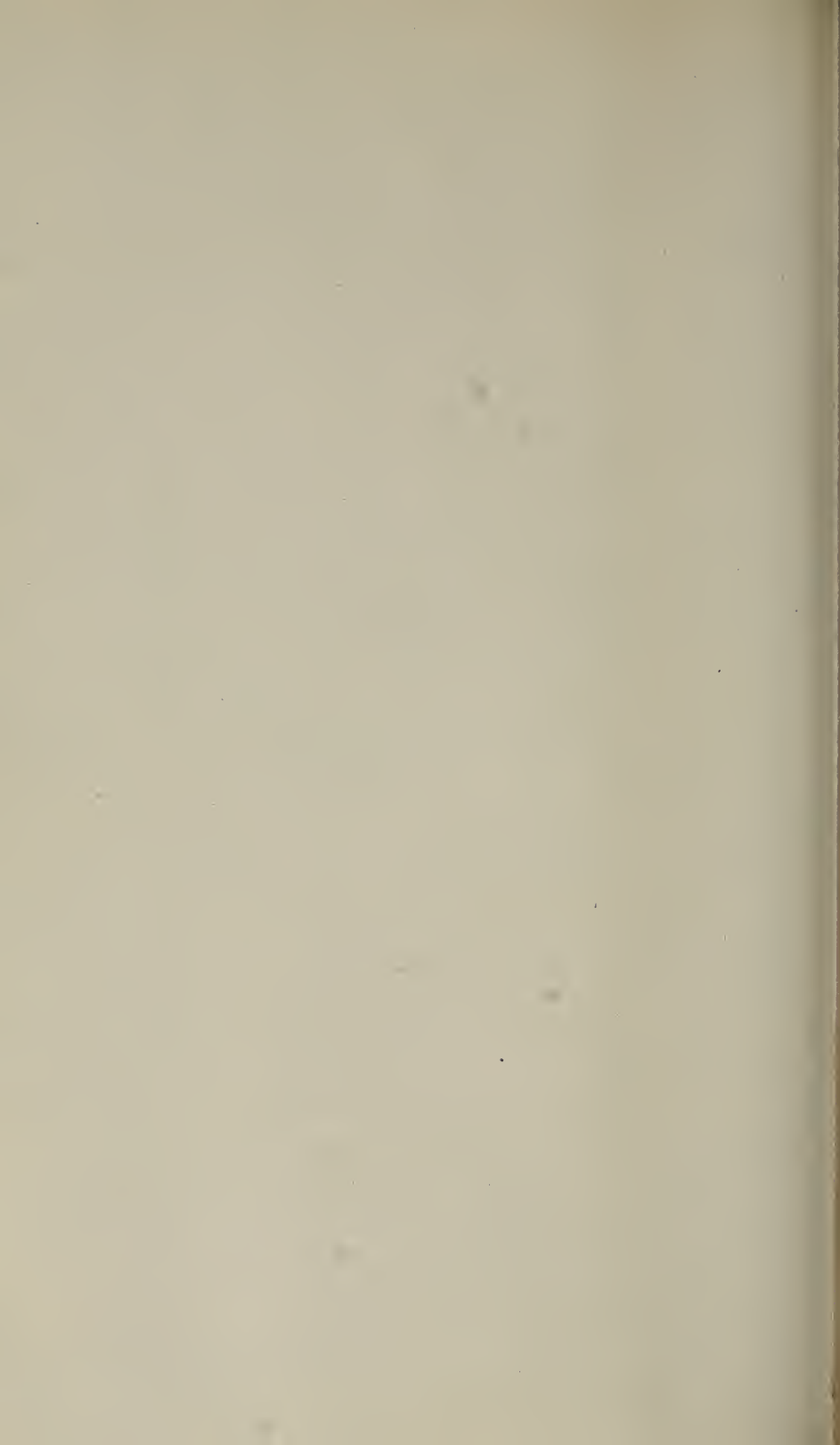
## TRANSCRIPT OF RECORD

VOLUME II

(Pages 423 to 870 Inclusive)

Upon Appeal from the District Court of the United States  
for the Southern District of California,  
Central Division

---



No. 11054

IN THE

# United States Circuit Court of Appeals

FOR THE NINTH CIRCUIT

---

INTERNATIONAL CARBONIC ENGINEERING  
COMPANY,

Appellant,

vs.

NATURAL CARBONIC PRODUCTS, INC., a corporation, GEORGE PEPPERDINE FOUNDATION, a corporation, L. H. POLDERMAN, W. L. BENSON and C. B. BENSON, individually and as a copartnership doing business under the fictitious firm name and style of Natural Carbonic Products,

Appellees.

---

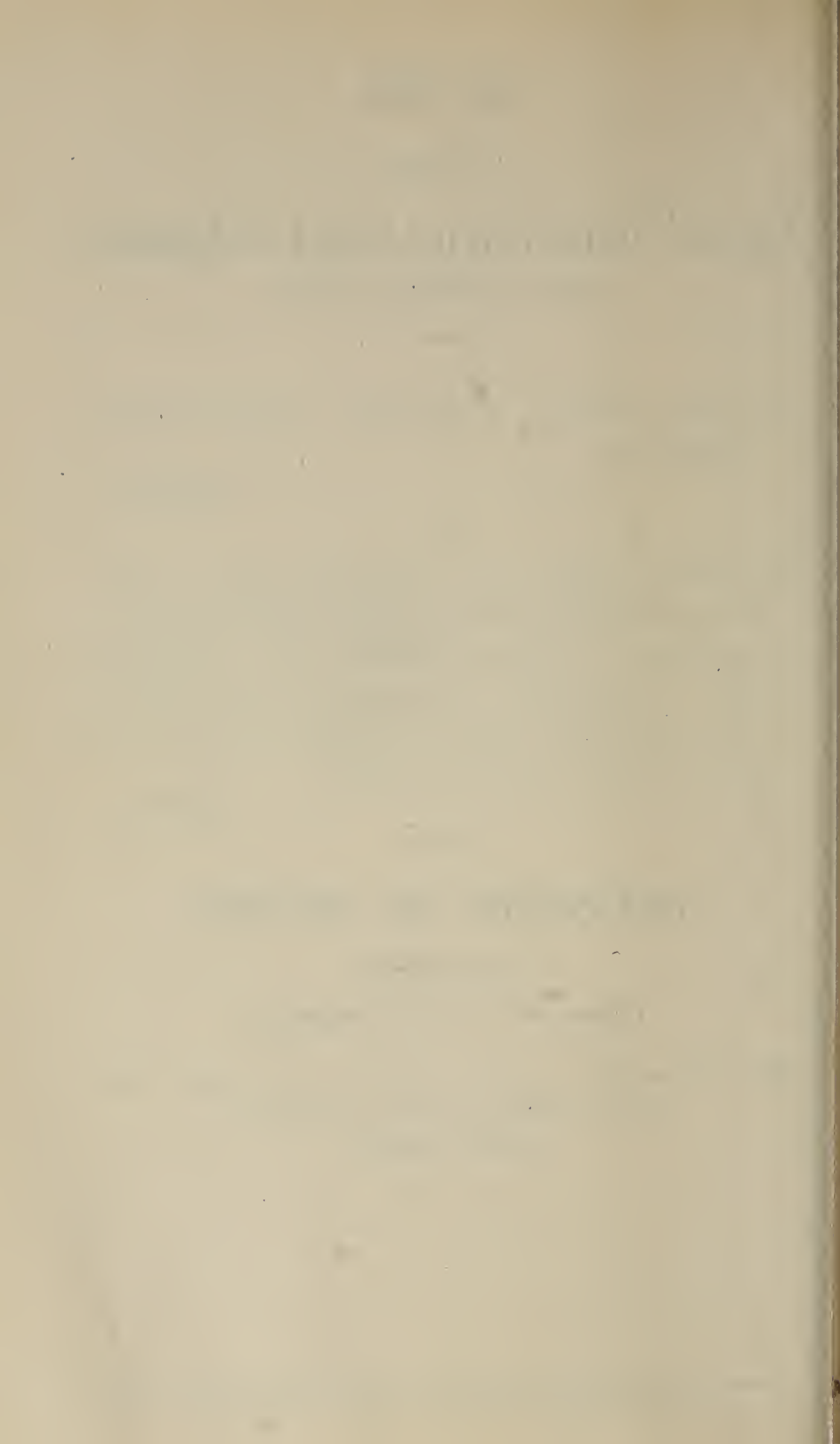
## TRANSCRIPT OF RECORD

VOLUME II

(Pages 423 to 870 Inclusive)

Upon Appeal from the District Court of the United States  
for the Southern District of California,  
Central Division

---





(Testimony of Earl P. Wells)

could not tell because he does not know. May that substitution be made? [777]

Mr. L. S. Lyon: Yes, certainly, your Honor.

The Court: It is totally a technical matter, but it might interfere with your record.

Mr. L. S. Lyon: The only thought I had, the witness was asked if this diagram was correct in all respects, and I supposed that to include the legends.

Mr. Morris: The Judge has ruled that it does.

The Court: Yes; it does, but it is what he understood by his testimony.

Mr. L. S. Lyon: Yes; I understand.

The Court: You get that by his testimony.

Mr. L. S. Lyon: I will reframe the question.

The Court: No; it is all right. It is in the record.

Q. By Mr. L. S. Lyon: Do you mean by your last answer—

Mr. Morris: The Judge has asked your question and the question is pending.

Mr. L. S. Lyon: Is there a question unanswered?

Q. By The Court: Is that what you meant by your testimony?

A. Yes. I had in mind and realized in answering my question that there was two types of operation on that snow formation, above and below the triple point.

Q. By Mr. L. S. Lyon: As you have observed the commercial operation of the defendant at the Niland plant since 1940 has it included both types of operation, both the snow forming below the triple point and the ice operation above the triple point? [778]

A. I have seen the press operated in both manners; yes, sir.

(Testimony of Earl P. Wells)

Q. I mean as far as you can speak for the commercial operation, have they employed both types of operation commercially?

A. I can't testify as to the amount of time spent in operating under either method of operation. [779]

\*      \*      \*      \*      \*      \*      \*      \*      \*

Q. By Mr. L. S. Lyon: You have stated that you observed both types of operation at the defendants' plant at Niland. What I would like to know is did you observe those being operated experimentally or in the regular conduct of the plant?

A. When I was at the plant last month they were operating above the triple point, and I made a record of the pressures in normal operation, as I requested the operator to make some ice in his normal manner so that I could record the pressures. In February of 1943 I recorded some pressures, and at that time the company was investigating the effect upon snow structure of various methods of operation. It was an experimental period in which they would make ice for a week under one condition, and then another week under another condition, so as to give time for that ice to reach the market and to get the market's reaction to it. To that extent it was an experimental period.

Q. In so far as you know of the regular operation in the defendants' plant as distinguished from any specially conducted demonstrations or experiments, which type of operation has been employed?

A. Well, all I can—

Mr. Miketta: Objected to as indefinite and ambiguous, your Honor. [780]

The Court: Read that question, please.

(Question read by the reporter.)

(Testimony of Earl P. Wells)

The Court: I presume you mean by "regular operation" the operations that he had observed during his visits?

Mr. L. S. Lyon: That is correct.

The Court: With that understanding, you may answer the question, if you can.

A. I did not particularly note the pressures in the press, except in connection with certain investigations which were made at different times for different purposes; and I have not usually inquired as to their normal method of operation. However, last month I was informed by the plant manager that for the past—

The Court: No, no, no.

Mr. L. S. Lyon: We can't have that, Mr. Wells.

The Court: That is mere hearsay that I struck out so violently a few moments ago.

Q. By Mr. L. S. Lyon: Did you keep a record of each of your visits to this plant during the years beginning with when you started your work on revamping it and up to the start of this trial? A. Yes.

Q. So you have a record by which you can tell us and give us the dates of each of your visits? A. Yes.

Q. Have you got that record with you? [781]

A. No; not with me.

Q. Will you bring that in Tuesday, if you can?

A. I can.

Mr. Morris: Will you read the answer, please?

(Answer read by the reporter.)

Mr. Foster: So he may be sure, your Honor, is the request for a record of the dates of the visits, or the records made on each trip? May I have that question, the next to the last question, if the court please?

(Record read by the reporter.)

(Testimony of Earl P. Wells)

Mr. L. S. Lyon: I understand the witness is entirely willing to comply with my request and that no order of the court is necessary, your Honor.

The Court: He has agreed. All you have asked him for is the dates.

Mr. L. S. Lyon: That is all I have asked him for in this question, was the records that show the dates.

The Court: Yes.

Mr. L. S. Lyon: And I think I have already asked the witness if he will bring the records that he has in so far as they show any of the operations at the plant in question. If they are just estimates of costs of equipment or labor or things like that, I do not want to burden you with bringing those in. I am only interested in any records you have that show the actual operations there.

Mr. Miketta: Actual operation of the snow press, your [782] Honor, but not of the compressing system and all the other machinery that is in the plant.

Mr. L. S. Lyon: In so far as any of your records reflect pressures of your equipment being operated, I would like to include those records.

The Court: Yes.

The Witness: I have confidential information interspersed with those records in this book and I would probably need to review the entire record.

Mr. L. S. Lyon: I am sure I do not want any of that.

The Court: Well, you may just reveal it as you are called on for certain specific information, from your records, and they will take care of that.

Mr. Foster: Would it be agreeable, in the light of the witness' last statement, if the pages were photostated or isolated in some way and those given to Mr. Lyon?

(Testimony of Earl P. Wells)

The Court: Yes; I think that would be satisfactory.

Mr. Foster: I do not wish to embarrass anyone.

The Court: If counsel does not object to the photo-static copy.

Mr. L. S. Lyon: I do not expect to offer all these records into evidence. I just expect the witness to testify from them.

Mr. Morris: I wonder if the books could be brought in or the records and be shown to your Honor, and your Honor let us have what is not confidential. [783]

Q. By the Court: How voluminous are they?

A. Not voluminous, your Honor.

The Court: All right; bring them in and I will look them over.

Mr. Morris: Very good.

Q. By Mr. L. S. Lyon: Can you remember which type of operation was adopted when the revamped plant was first placed in use?

The Court: As between the triple point and the snow?

Mr. L. S. Lyon: Yes, your Honor.

A. No; I can't recall just how the press was operated at that time, because my contract did not concern the press.

Q. Were you ever concerned with the operations of these presses, so-called, at this plant?

A. After the plant was in operation for a period, I helped to conduct some experiments to study the effect of pressures on ice structure with the Frick presses.

Q. And when was that?

A. That must have been about August, 1940. [784]



(Testimony of Earl P. Wells)

Q. By Mr. L. S. Lyon: Do you have any knowledge of the results obtained with the operation of the revamped plant when it was placed in operation?

The Witness: Will you read that question to me, please?

(Question read by the reporter.)

A. Yes.

Mr. Miketta: It is vague and indefinite, your Honor, as to what is meant by the plant. There are a great many things in that plant that have no bearing on this case.

The Court: I think he meant by "plant" these Frick presses that they were experimenting with. Is that correct?

Mr. L. S. Lyon: Yes; including the gas cycle with which they are operated.

The Court: That is right. Your answer is "yes" to that?     A. Yes.

The Court: Very well.

Q. By Mr. L. S. Lyon: How did you obtain that knowledge? [785]

A. Well, I was there when the plant was put into operation and I saw the results of the operation.

Q. How long did you remain there?

A. I was at the plant during the entire construction period and there most of the time during the following two months.

Q. Of its operation?     A. Of its operation.

Q. And what was your purpose in being there? What were your duties or responsibilities in connection with that?

A. To test the equipment and remove difficulties of operation and minor mechanical matters.

(Testimony of Earl P. Wells)

Q. Do you know whether or not any difficulties were experienced in the operations, particularly of the apparatus for solidifying and pressing the dry ice or the associated gas compressing equipment?

A. No; there was no difficulty experienced with the press. The press had been in use for many years and its operation was fairly well established.

Mr. L. S. Lyon: I move to strike out the statement that the press had been in use for many years, as volunteered.

The Court: That portion may be stricken and the balance may stand.

Q. By Mr. L. S. Lyon: What was the occasion for this experimental work that was carried on in August, 1940?

Mr. Foster: That is objected to as no foundation.  
[786]

Q. By Mr. L. S. Lyon: If you know?

The Court: Objection sustained as being immaterial.

Q. By Mr. L. S. Lyon: What was the experimental work that was carried on in August, 1940?

Mr. Foster: Objected to as immaterial.

Q. By Mr. L. S. Lyon: What experiments were conducted?

The Court: Objection sustained.

A. The pressures in the press were varied, the time cycles were varied, and some changes were made or variations made in the purification apparatus of the plant.

Q. By Mr. L. S. Lyon: Did you participate in the planning or conducting of those experiments?

A. Yes.

Q. As a result of those experiments were any changes made in the operation of the solidifying and press ap-

(Testimony of Earl P. Wells)

paratus, either as to the pressures or the times involved in such operations? A. No.

Q. At that time was the regular operation a snowing operation or a triple point operation?

Mr. Foster: Objected to as indefinite in the use of the word "regular."

Mr. L. S. Lyon: Well, I think we know what that means.

The Court: Read that question, please.

(Question read by the reporter.)

The Court: By that time, you mean this period during [787] these experiments, do you?

Mr. L. S. Lyon: That is correct.

The Court: This period during experiments.

Mr. L. S. Lyon: That is correct.

The Court: The objection will be overruled.

A. Well, I should say that during that experimental period there would be no regular method of operating the plant. However, in the plant the men who were operating the press were former employees of the previous owner of the plant.

Mr. L. S. Lyon: I move to strike that statement as volunteered.

The Court: That portion may be stricken. Just tell us what you did as far as operation was concerned. You say you did not conduct regular operations; they were experimental operations during that time? A. Yes.

[788]

\* \* \* \* \*

Q. Do you know what pressures and times were employed in the operation of the solidifying and pressing equipment in that plant beginning with the placing of the



(Testimony of Earl P. Wells)

plant in operation following its revamping and up to the termination of this experimental work that was conducted in August, 1940?

A. Well, the pressures were maintained both above and below the triple point during that period.

Q. Then, the operation of the plant in so far as the pressures were concerned was irregular?

A. Yes, sir.

Q. During that period?

A. That is right. The various operators had different ways of operating and there was considerable disagreement as to how the press should be operated.

Q. And that included some operations of what we call the snowing type as distinguished from the triple point type? A. Yes.

Q. And, on the other hand, included some operations of the triple point type? A. Yes.

Q. Can you tell us when, if you know, a regular operation was adopted in that plant? [789]

A. I can't recall what press pressures were maintained following that period, because the results of our experiments were not directed or did not—were not affected by the pressures in the press. We found that we had to make some changes in the purification apparatus, which took care of our difficulties, and that the pressures in the press were immaterial.

Q. Well, ultimately, a regular operation was adopted, was it not?

A. Yes; as regular as the previous operation had been under the previous owners, which was—

Mr. L. S. Lyon: I move to strike that statement out as volunteered.

(Testimony of Earl P. Wells)

The Court: Yes; that may be stricken. Explain it, rather, as what was actually done.

A. At that time the plant made two kinds of ice, above and below the triple point, or at least the majority of the operators favored that method of operation, whereby they would make triple point ice in the summer-time when the customers were less critical, because they could make greater production; and in the wintertime they made ice below the triple point because it was finer texture and more easily sawed and had better keeping qualities.

Q. By Mr. L. S. Lyon: How long did that practice continue, to your knowledge?

A. I can't state, to my knowledge, because I did not [790] remain at the plant after that time.

Q. And you are now referring to what date?

A. Following August, 1940.

Q. You have had no regular connection with the plant since that time?

A. As a consultant I have visited the plant several times and have done some minor work there, but in connection with other parts of the plant.

Q. You have acted as a consultant for that plant since what date?     A. Since the plant was rebuilt.

Q. What has been included within your activities as a consultant?

Mr. Foster: Objected to as immaterial.

Q. By Mr. L. S. Lyon: What has been the nature of the advice or your participation in the operation of that plant?

The Court: Objection overruled.

A. I have worked on any specific problems that were assigned to me by the owner.

(Testimony of Earl P. Wells)

Q. By Mr. L. S. Lyon: Have you been consulted at any time with reference to the pressures that should be employed? A. No.

Q. Have you been consulted at any time with reference to the order of manipulation of the solidified and pressing apparatus? A. No. [791]

Q. You have had nothing to do with the pressing and solidifying apparatus?

A. Only to the extent of its effect upon the rest of the system, that is, the rapidity with which the gas is withdrawn from the press and returned to the rest of the system, and its effects upon the pressure in the system.

Q. You have stated that the apparatus there is equipped with pressure gauges. Will you tell us how many pressure gauges and where they are located?

A. The H. P. M. press has a gauge connected to the chamber, the upper part of the chamber, and the same is true of the two Frick presses. [792]

Q. One gauge?

A. Each press has its own guage.

Q. And that is the only gauge by which you can measure the pressure in the press? A. Yes.

Q. Will you relate whether or not any predetermined pressure is maintained in that plant to your knowledge? I refer by "plant" to the solidifying chamber.

Mr. Foster: Objected to as indefinite in the use of the word "predetermined".

The Court: I don't think it is indefinite if he can answer it. It is a compound question, of course. You might break it up. So far as you know, is a constant pressure maintained in the gas chamber in these devices?

A. No, no constant pressure is maintained. It is extremely variable.

(Testimony of Earl P. Wells)

Q. Is that true of the triple point operations?

A. Yes, there is no effort to maintain any pressure in the press during the triple point operation.

The Court: Any minimum pressure?

A. Until the point of pumping out has been completed and the gas is vented at 5 or 10 pounds.

Q. By Mr. L. S. Lyon: You have personally observed the gauge on these different apparatuses during the boil-out period, have you? A. Yes. [793]

Q. What does the gauge show?

A. It stands at practically 60 pounds gauge during the liquid boiling phase.

(Short recess.)

Q. By Mr. L. S. Lyon: Mr. Wells, is Exhibit I equally correct for either the snowing operation or the triple point operation, as it was employed in the plant at Niland, during the time we have been inquiring about?

A. In Figure 2 it would not be correct for triple point operation, because the snow formation does not take place until after the liquid valve is closed.

Q. Are there any other differences as to either operation? A. No, I can see no others.

Q. Will you refer now to Figure 1 of Exhibit I. That illustrates the apparatus at the commencement of a new cycle; is that correct? A. Yes.

Q. What would the pressure gauge read at that stage?

A. Zero.

Q. Referring now to Figure 2, that illustrates the apparatus during the inlet of the liquid CO<sub>2</sub>; is that correct? A. Yes.

Q. And the legend "snow formation with gas release" would apply only to a snow type of operation, would it not? [794] A. Yes.

(Testimony of Earl P. Wells)

Q. And in the snowing operation, as practiced at that plant, how long would the liquid delivery continue? Over what period of time?

A. In the H. P. M. press a matter of five minutes. It varies. If I may refer to my diagram. Yes, I should say five minutes.

Q. What would be the reading on the pressure gauge during that time?

A. That would depend upon what pressure the operator might wish to maintain, or it might depend upon the number of compressors connected to the flowback line. At the Natural Carbonic Products plant, when they are making ice below the triple point, they do not attempt to maintain any particular pressure in there, or a steady pressure, but they do have this pressure to 60 pounds. If they have two compressors connected to the return line it is just a matter of proportion between the liquid inlet and the gas outlet.

Q. From your observation, what was the reading of that gauge during that period?

A. At what time is that?

Q. During the inlet of the liquid CO<sub>2</sub>? We are talking now about the Frick press, as I understand it, operated in accordance with the snowing operation.

A. Well, my only observations of the press when [795] steady pressures were maintained in there were during experiments which I made. At other times I have seen pressure within the range of 40 to 55 pounds during the snowing period, just as a casual observation, however.



(Testimony of Earl P. Wells)

Q. You haven't made any studied observations of the pressure at this stage of the operation of the Frick press; is that correct?

A. Do you mean studied observations of the normal method of operation?

Q. Yes.

A. No, they were merely casual, because I was not concerned with the operations.

Q. Can you answer as to the H. P. M. press, how long a time is taken up in the running of the liquid CO<sub>2</sub> into that press?

A. The five minutes that I mentioned was for the H. P. M. press.

Q. Will you answer as to the Frick press?

A. In the Frick press the snowing time is approximately a minute and a half.

Q. What was the pressure indicated by the gauge during that time, in the regular operation of those presses, as you observed it?

A. I can't recall, because those presses have been used very little since the H. P. M. press was installed, in 1941. [796]

Q. Can you explain more definitely what you mean by "very little"? Has it been some time since they were operated, or what do you mean by very little?

A. I mean I made a few observations some time ago, in 1939.

Q. We are not interested in 1939. We are trying to find out since this plant was revamped, how much have the Frick presses been used, or what do you mean by the term that they have been used very little?

(Testimony of Earl P. Wells)

A. The H. P. M. press has been used in place of the Frick. The Fricks were used for peak load conditions, and usually when I was not at the plant.

Q. How long has it been since you have actually observed the employment of the Frick presses in regular operation? A. I would say the summer of 1940.

Q. Referring again to Figure 2 of Exhibit I, and the H. P. M. press, how long is the feeding period or time when the press is being operated in accordance with the snowing operation?

Mr. Miketta: That is objected to as having been asked and answered before.

Mr. L. S. Lyon: I will amend the question. I think that is right, your Honor.

Q. In accordance with the triple point operation?

A. About three minutes. [797]

Q. What does the pressure gauge read during that operation?

A. That varies from 65 to about 75 pounds, during my observations.

Q. During the feeding of the liquid CO<sub>2</sub> into the solidifying chamber? A. Yes.

Q. During that period there is no snow formation in the chamber; is that correct?

A. Substantially none, yes.

Q. During that period what is the position of the valve which bears the legend "Return" in Figure 2?

A. That is open; wide open.

Q. What is that return line connected to?

A. To the pumping-out compressor.

(Testimony of Earl P. Wells)

Q. What is the back pressure on this line?

A. The line is quite large, and the pressure at the suction of the compressor is probably three pounds lower than in the chamber, due to the friction in the line.

Q. What stage of the compressor?

A. What stage in the operation?

Q. Is this a single or multiple stage?

A. A single stage compressor, pumping up to 110 pounds, approximately.

Q. Passing to Figure 3, my questions are going to be directed to the H. P. M. press, in view of your testimony, [798] how long does the apparatus remain in the position shown in Figure 3, in the case of a snowing operation?

A. Approximately two minutes.

Q. What is the pressure indicated on the gauge during that operation?

A. The pressure continues to fall from the time the liquid valve is closed until it reaches five or ten pounds and the vent is opened.

Q. How long a period does that drop take?

A. About two minutes.

Q. Can you answer the same questions as to Figure 3, applied to a triple point operation?

A. Yes. That period requires about four minutes.

Q. What does the pressure gauge show during those four minutes?

A. It drops from triple point of about 60 pounds to five or ten pounds, when the vent is open.

Q. Which one of these figures represents the position of the apparatus during the boil-out period in a triple point operation?

A. None of these figures shows that. Pardon me; Figure 3.



(Testimony of Earl P. Wells)

Q. During the boil-out period the gauge indicates the pressure of 60 pounds, doesn't it? A. Yes.

Q. During that period the pressure doesn't drop, [799] and the drop begins with the end of the boil-out period; isn't that right? A. Yes.

Q. Is any change made in the apparatus at all at the end of the boil-out period?

A. No; everything remains the same.

Q. Throughout the boil-out period?

A. The pump-out.

Q. And during the period of drop of pressure to five or ten pounds, the point you have indicated?

A. That's right; no change.

Q. Then what is done in the triple point operation, in that plant?

A. When the pressure is five or ten pounds the vent is open.

Q. And the blowout valve closed? A. Yes.

Q. What is the purpose of the blowout valve at that time?

A. To prevent air from entering the vent line and getting into the compressor.

Q. In a snowing operation what is taking place when the apparatus is as shown in Figure 4?

A. The snow is resting on the lower platen, and the pressure in the chamber is zero pounds. Snow and gas are escaping around the platen. [800]

Q. What was the purpose of dropping the platen from the position shown in Figure 3 to the position shown in Figure 4?

A. One reason is to relieve any dangerous pressures in there during—

Q. What—

(Testimony of Earl P. Wells)

Mr. Foster: Just a minute. The witness hasn't finished his answer. I think he should be given an opportunity to do it.

Mr. L. S. Lyon: You may proceed. I did not mean to interrupt you.

A. It is to relieve gas pockets at the bottom of the pile of snow so that when the plunger comes down it will not cause gas pockets which later might explode and injure the operator on opening the press.

The Court: It is just an extra vent, conveniently located? A. Yes.

Q. By Mr. L. S. Lyon: How big is this vent line to the air? What is the diameter?

A. I don't know the exact size, I should judge about an inch or an inch and a quarter.

Q. How far out does it extend from the apparatus before it takes its upward course that you have described?

A. About a foot.

Q. Then how far does it extend? [801]

A. About six feet.

Q. Is that above the top of the chamber?

A. Approximately close to the top of the hydraulic chamber.

Q. But above the top of the solidifying chamber?

A. Yes, about six or eight feet.

Q. Have you observed what takes place in the operation of this H. P. M. press when the lower platen is lowered, as indicated in Figure 4 of Exhibit I?

A. Yes.

Q. What happens?

A. There is an increase in the amount of gas leaking out there.

(Testimony of Earl P. Wells)

Q. In effect you just crack that seal, and some gas escapes; is that right?

A. Yes, there is a visible quantity of it.

Mr. Miketta: I object to the question as leading, and assuming facts not in evidence.

Mr. L. S. Lyon: I intended it to be leading, on cross examination.

The Court: Read the question, please.

(Record read by the reporter.)

The Court: Objection overruled.

Q. By Mr. L. S. Lyon: Is that true of the effect of dropping the lower platen slightly, as shown in Figure 4, Exhibit 1, both in the snowing operation and in the triple [802] point operation?

A. Yes, it is the same operation.

Q. After the pressure has dropped down to about five or ten pounds, and you have opened the vent to the air, as shown in Figure 4, then thereafter the return valve remains closed and the vent to the air remains opened for the remainder of the cycle; is that correct?

A. It remains open until the point where the lower platen is lowered to remove the ice.

Q. And at that time the vent to the air valve is closed; is that correct?

A. Yes.

Q. What is the purpose of doing that?

A. It is to prevent the inlet of air, moist air, when the platen is dropped, and it also permits a little accumulation of gas above the ice block, which helps to push it down onto the lower platen for removal. It is also preparatory to starting the next cycle.

Q. In the operation of this press how is the block ejected, or caused to leave the chamber?

(Testimony of Earl P. Wells)

A. My guess is that it drops by gravity when the friction between the block in the chamber is decreased by sublimation in the snow and surface of the block. However, if the operator is in a hurry he can force the block to drop, overcoming the friction by exerting the gas pressure above the block. [803]

Q. Is it possible for him to apply further pressure from the upper plunger to force the block down out of the chamber, to release it?

A. I have never seen them use the upper plunger for pushing the block out.

Q. From your knowledge of the machine, can it be so used? A. Yes.

Q. You have said, in one of your previous answers, something about a guess. Why did you use that expression? Are you not sure of your answer?

A. I have no way of knowing the exact amount of friction between the block and the chamber, nor the amount of heat entering the block from the chamber walls, as to whether it would sublimate that gas to ice in a sufficiently short time to reduce the friction.

Q. Have you observed whether or not it is necessary to pause in the operation when you are ready to discharge the block from this press, to allow for some time for the block to unfreeze?

A. Yes, there is a matter of perhaps 15 seconds there between the time when the lower platen is dropped three inches, let's say, and the block drops down to it.

Q. So the fact is that when the apparatus is in the position shown in Figure 7 of Exhibit I, the block is frozen in the chamber; is that right? [804]

A. I wouldn't use the word "frozen". I would say it is bound in there by friction.

(Testimony of Earl P. Wells)

Q. Bound to the side walls? A. Yes.

Q. Is that true, whether the operation is a triple point operation, or a snowing operation?

A. To my knowledge, yes.

Q. In the operation at this plant of the H. P. M. press, is the platen lowered substantially away from the press before the block is freed, so that the block falls a substantial distance onto the bottom platen, or is the platen lowered as the block comes out of the chamber?

A. The platen is held at a point where the top of the boss is about a half an inch below the chamber, so that the operator can see the block fall onto the platen.

Q. How far does it fall? A. About 2½ inches.

Q. Is it then necessary to lower the platen further, carrying the block, in order that the block may come out of the chamber? A. Yes.

Q. In operation is that done?

A. Yes, it is done.

Q. And the lower platen is lowered carrying the block until the block is free from the bottom of the chamber; is that correct? [805] A. Yes.

Q. Do you have Plaintiffs' Exhibits 3 and 4 before you, Mr. Wells? A. Yes.

Q. Were those drawings made by your company?

A. No, they were not.

Q. Do you know by whom they were made?

A. Yes, judging from the initials there, WLB, it would be William L. Benson, superintendent of the plant.

Q. At Niland? A. At Niland, yes.

Q. One of the defendants in this case? A. Yes.



(Testimony of Earl P. Wells)

Q. How did that come to bear the legend of your company, do you know?

A. At the time we were building the plant I had some of our tracing paper at the plant to make drawings as the work progressed. At the close of the job I did not remove the extra paper and he apparently used it.

Q. Were you consulted at all about the preparation of these exhibits 3 and 4? A. No, not at all.

Q. When were you first consulted with reference to preparing any of the drawings or diagrams that you have produced here?

A. About April 15th I was requested to go to the [806] plant and make an inspection.

The Court: What is the question and answer?

(Record read by the reporter.)

The Court: That doesn't answer his question, I am afraid.

A. I am assuming that the visit to the plant is the preparation for the making of the exhibit.

The Court: I wanted to be sure that the relationship was in the record.

Q. By Mr. L. S. Lyon: These valves of the H. P. M. press, how is the inlet valve operated, by a turn-wheel, by a pull rope, or chain, or how?

A. It's a lever on a cock-type of plug valve.

Q. How is the return valve operated?

A. In the same manner.

Q. How is the valve that controls the vent into the atmosphere operated? A. In the same manner.

Q. Can the operator manipulate all these valves standing at the press? A. Yes.

Q. And does he do so? A. Yes.

(Testimony of Earl P. Wells)

Q. It isn't necessary to have any chains, ropes, or anything of that kind?

A. No, the levers are long enough to be within reach.  
[807]

Q. Is that also true of Frick presses? A. Yes.

Q. You are sure of that?

A. Yes, except I believe in the case of the Frick press there is a hand wheel for the blowout line valve. The other two valves are of the cock type.

Q. Where is the hand wheel located?

A. On the right-hand side of the press.

Q. How close to it?

A. Within easy reach of a man's arm; on the same level. I will change that answer: About a man's head height.

Mr. L. S. Lyon: That is as far as I would like to go with this witness until we have the other records, and if it can be arranged for us to see them over the week-end, we might not have to take any of your Honor's time in regard to that.

Mr. Foster: We will try to produce them Monday and telephone you, Mr. Lyon.

Mr. Miketta: That will be perfectly agreeable.

The Court: Any redirect examination?

Mr. Miketta: Yes, your Honor, I would like to clarify a few points.

The Court: You may proceed. [808]

#### Redirect Examination

Q. By Mr. Miketta: Mr. Wells, you were asked regarding your consulting connection with respect to the Natural Carbonic Products Company's plant. Are you

(Testimony of Earl P. Wells)

personally employed as a consulting engineer by Natural Carbonic Products?

A. No; my company has an agreement to perform consulting functions, and contracting functions.

Q. Regarding the so-called revamping which took place in early 1940, what did that actually consist of?

A. It all had to do with parts of the plant other than the presses, consisting of changes in heat exchangers, gas driers and purifiers.

Q. It had nothing to do with the actual operation or construction of the snow presses?

A. That is correct.

Q. It only pertained to the liquefaction of the carbon dioxide and its purification, is that correct?

A. Yes.

Q. Your company is engaged in maintaining that particular equipment in efficient form?

A. No, the maintenance is performed by the plant engineers and operators.

Q. But your consulting connection pertains more directly to the purification and liquefaction parts of the plant, is that correct? A. Yes. [809]

Q. Will you please refer to Fig. 3 of Exhibit I. During a triple point operation, where the maximum pressure in the chamber is in excess of 60 pounds, is snow formed at the stage indicated in Fig. 3?

A. Yes.

Q. So that I correctly express, or I correctly identify Fig. 3 as a triple point operation, what legend would you apply to Fig. 3?

A. I would eliminate the word "continued".



(Testimony of Earl P. Wells)

The Court: I do not understand that.

A. Or you can also add the words "snow or ice formation."

Q. By Mr. Miketta: In other words, the legend applied to Fig. 2 of Defendants' Exhibit I stating "snow formation with gas release" that takes place during a snowing operation, is that correct?

A. Yes, snow forming.

Q. But after the inlet valve is closed, as indicated in Fig. 3, then during a triple point operation snow formation takes place in Fig. 3?

A. Yes, and not in Fig. 2.

Q. Were you asked to make any drawings for us in this case?      A. No.

Q. You stated that lowering the platen, as shown in Fig. 4 of Exhibit I, breaks the seal with the chamber. Do you mean by that answer that prior to that time the lower [810] platen seals the chamber hermetically?

A. Not gas-tight under normal operating conditions, no.

Q. Refer to Figs. 7 and 8 of Exhibit I. Is that lower platen moved downwardly by the application of positive hydraulic pressure, or does it move downwardly by gravity?

A. By gravity, to the best of my knowledge. I am not certain about all of the hydraulic connections in that lower cylinder. That is, I mean it might be possible to drive it down with proper connection to the oil pump, but to the best of my belief it falls by gravity.

Mr. Miketta: That will be all, your Honor.

Mr. Foster: I have nothing, your Honor.

(Testimony of Earl P. Wells)

Recross Examination

Q. By Mr. L. S. Lyon: When you indicated the different legend that should be applied to Fig. 3 in the case of the triple point operation, in using the word "snow", that word would be used to indicate ice formation, would it not?

A. Yes. I don't think the word "snow" has really been defined by anyone at this trial.

The Court: Haven't we generally been talking about snow below the triple point, and ice above it?

Mr. Foster: Some of plaintiffs' witnesses, I think, did so refer to it.

The Court: Let us find out just what he meant. As I understood you, Fig. 2 was intended to refer only to the snowing operation and the pressure there would be below the [811] triple point, and on down usually from 55 down to atmosphere. In 3 you have your pressure falling to about 5 degrees in a couple of minutes, in your snowing process, but if you are working on a triple point operation you take about a minute more and run the pressure down from 60.4, or thereabouts, down to about 3 or 4 degrees, after the boiling-out period, is that correct?

A. Yes.

Q. By Mr. L. S. Lyon: Will you refer to Plaintiffs' Exhibit 4, in front of you, which is the diagram prepared by Mr. Benson of the H. P. M. press. I call your attention to the legend reading, "Gas sealing insert," at the bottom of the chamber, and the legend reading, "Sealing ring" at the top of the lower platen. Have you ever examined those in the H. P. M. press at Niland?

A. No, not carefully.

Q. Do you know what they are?

A. I don't know what material they are made of.

(Testimony of Earl P. Wells)

Q. Have you ever seen them at all?

A. Yes, I have seen the tongue and groove.

Q. What are they, as nearly as you can tell us from your examination?

A. I didn't examine them, but as I recall it, the ring is metallic, and the groove above has a gasket type of material in it.

Q. What would be the purpose of the use of those elements, [812] from your knowledge as an engineer?

A. To obtain substantial tightness.

Q. As I understand you, such a tightness is substantially obtained, but there is some leakage due to some ice formation, is that correct?

A. Yes, foreign material, and damage to the gasket materials.

Q. But substantially the lower platen is sealed against the bottom of the chamber until the lower platen is lowered, as indicated in Fig. 4 of Exhibit 1?

A. Yes.

The Court: Fig. 1 of Exhibit I?

Mr. L. S. Lyon: Fig. 4 of Exhibit I. Did I say Ex. 1?

The Court: Yes.

Mr. L. S. Lyon: Excuse me.

Q. Can you give us any idea of the amount of CO<sub>2</sub> gas that is escaping at the bottom of the chamber before the platen is moved to the position shown in Fig. 4, of Exhibit I? Is it a lot of gas, or a small amount?

A. It is a thin stream of gas that occurs at different parts of the platen, at different times. I don't know that there is any way of measuring it. It can be felt by pressing one's hand up there, or watching the moisture in the gas stream.

(Testimony of Earl P. Wells)

Q. By the Court: What is this seal mechanically, a kind of tongue and groove affair? [813]

A. Yes, a tongue and groove gasket.

Q. One fits down into the other? A. Yes.

Q. By Mr. L. S. Lyon: From your knowledge of the engineering aspects and operation of this H. P. M. press what percentage of the CO<sub>2</sub> that is fed into the chamber do you believe escapes from the chamber before the lower platen is lowered to the position shown in Fig. 4?

The Court: Under what pressure?

Mr. L. S. Lyon: If it is different, answer for the snowing operation; and if it is different for the triple point operation, answer for that.

A. I would estimate about 5 percent.

The Court: Are you averaging it now?

A. Yes; I would say that would be an average between good and poor condition of the machine.

Q. By Mr. L. S. Lyon: Have you ever measured it?

A. No.

The Court: Wait a minute. At this time of which you are speaking, the air vent is closed, is it not?

A. Yes.

Q. But the return valve is open? A. Yes.

Q. What is the relationship of the pressure in the conduit to the return valve with the valve open, and the chamber itself? [814]

A. The return conduit is practically the same pressure as the chamber, except for pipe friction, due to the flow.

Q. Two or three pounds difference?

A. Two or three pounds difference between the compressor and the press.

Q. By Mr. L. S. Lyon: You have distinguished between a good operation and a poor operation. The

(Testimony of Earl P. Wells)

amount of leakage at the bottom of the chamber in the H. P. M. press, as you have seen it at the defendants' plant at Niland, varies, doesn't it?

A. It varies with the operators, and humidity.

Q. Some of them get a better seal than others?

A. Yes.

Q. At times they get a very complete seal, do they not?

A. At the start of the day, or after the new seal has been installed, it's good for a while.

Q. Do they change this seal from time to time?

A. No, but moisture freezes on there from the air.

Q. When that happens, what is done?

A. Chunks of water ice get in between the tongue and groove and keep them spaced apart. [815]

Q. And then what does the operator do?

A. Well, he occasionally wipes it off with a cloth.

Q. What did you mean a moment ago when a new seal is put in?

A. Well, over a period of months or weeks the gasket material may become damaged and need replacement.

Q. And when it is replaced, then the seal is more absolute or perfect than after it has been operated for a time, is that correct? A. Yes.

Q. By the Court: What is this seal made of?

A. I can't say.

Mr. L. S. Lyon: I haven't any more questions this afternoon, your Honor, and I will try to go over the witness' material before Tuesday and see if it is necessary to call him; and if it is not, why, he can be excused. But I might have some more questions, something I would like your Honor to hear, based on his records, when I see them.



(Testimony of Earl P. Wells)

Mr. Miketta: We would like to have him on those records also, your Honor.

Mr. Foster: We were reserving, as I understood, our right of examining him after observing the exhibit he had prepared.

Mr. L. S. Lyon: That is correct, that is correct. I think he will have to come back.

The Court: I think he will have to come back Tuesday [816] morning. I am sorry, but I might have something that occurs to me in the middle of the night. [817]

\*     \*     \*     \*     \*     \*     \*     \*

EARL P. WELLS,

recalled.

The Court: Refresh me as to the present status of this witness. He is on cross examination now, isn't he?

Mr. L. S. Lyon: The matter of Exhibit J was put over until this morning, and perhaps counsel for the plaintiffs will want to continue with the Exhibit J or withdraw it, one or the other.

The Court: Yes. Suppose you do that or let them examine him on voir dire in connection with it. My recollection of it was that I sustained an objection to this J for identification on the ground that the proper foundation had not as yet been laid; is that correct?

Mr. Miketta: I think so, your Honor, basing it upon the plaintiffs' objection that the original records were not produced.

The Court: That is right. Now suppose you lay the foundation.

You have a copy of it?

The Witness: I have the original; yes, sir.

The Court: The original. [821]

(Testimony of Earl P. Wells)

Further Direct Examination

Q. By Mr. Miketta: Mr. Wells, have you been able to locate the original records from which the graphs shown on Exhibit J were made? A. Yes.

Q. And have you also gone over your records for the purpose of establishing the dates upon which you actually visited the plant? A. Yes; I have. [822]

\* \* \* \* \*

Q. By Mr. Miketta: Mr. Wells, will you please check your record, and from your examination give us the dates on which you actually visited the plant at Niland, California? A. Yes.

Mr. L. S. Lyon: To save time, may I be allowed, as the witness identifies these records of the dates of his visits—may I be allowed to see the record at that time, instead of having to go over it again later?

The Court: If there is nothing of a confidential nature he wants to claim at the time, you may do so.

Q. By Mr. Miketta: Will you indicate, Mr. Wells, in checking each date, the character of the note, the correspondence, or letter which you used in establishing that date?

Mr. L. S. Lyon: I would like to have him first exclude visits in 1939, if your Honor please, upon the ground I have heretofore stated. [825]

The Court: These same machines were not in place at the same plant in 1939?

A. Some of them were, your Honor, yes.

Q. Which ones?

A. The two Frick presses were in operation in 1939, and up to date.

(Testimony of Earl P. Wells)

The Court:    The motion will be denied.

A.    The first note I have is a hotel receipt, which is March 18, 1943.

Mr. L. S. Lyon:    May I approach the witness to just note his record?

The Court:    Yes.

A.    It is Hotel Planters, showing that I was at the location at that time; here is a letter dated March 26, 1943, to Natural Carbonic Products; subject: Plant inspection. March 19, 1943. The first paragraph reads—

Mr. L. S. Lyon:    I don't think he should read it.

The Court:    It is just for the purpose of refreshing your memory as to the date you visited the plant.

A.    Letter, May 10, 1943, referring to a visit to the plant on May 4, 1943; letter addressed to Natural Carbonic Products.

Q.    By Mr. Miketta:    Whose letter?

A.    Gay Engineering Corporation.

A sheaf of notes made during a trip to Niland, April 22 and 24, 1941; [826]

A letter from Gay Engineering Corporation to Natural Carbonic Products, dated April 28, 1941, referring to a recent trip to the plant. Apparently the exact date of that is not shown. It would be referring to these previous notes, which would be referred to in that letter;

A page of test data taken at the plant, showing various pressures, under date July 8, 1941;

Letter from the Gay Engineering Corporation to Natural Carbonic Products, dated July 10, 1941, referring to a visit to the plant on July 8, 1941;



(Testimony of Earl P. Wells)

A letter from Gay Engineering Corporation to Natural Carbonic Products, dated April 4, 1941, referring to a recent visit to the plant; the exact date is not specified;

Letter of February 26, 1942, from Gay Engineering Corporation to Natural Carbonic Products, referring to a visit to the plant on the previous day, February 25.

Then, in my diary there is an entry under June 25, in which I note: Watched operations at the plant.

Mr. L. S. Lyon: What year? A. 1941.

Q. Is that June?

A. June 25, 1941. Another entry under July 7, referring to taking the train to Brawley. That is 1941.

July 8, notation I found that the plant had been doing less than 19 tons.

Q. 1941? [827]

A. Yes, 1941. July 9, same year, notation that I repaired the discharge valves of the first stage machine.

Starting 1942, February 26 and 25, notation I drove to the plant in the evening of the 24th.

Starting 1943, notation under March 18, trip to plant; Under May 4, visit to plant.

Those are all the entries here. In addition I have—

The Court: Before you leave, you having refreshed your memory by your diary do you know that you were at the plant on the 19th of March, 1943, and the 5th of May, 1943, as well as on the 18th and 4th, respectively; that is, the following two days indicated there?

A. Will your Honor repeat the date again?

The Court: March 19 and May 5.

A. '43?

Q. '43, yes.

A. I have a notation in my book, 18th and 19th.

(Testimony of Earl P. Wells)

Q. And May 4th?

A. My notation is May 4 and 5.

Q. What about October, '42?

A. October, '42. I see nothing in my diary referring to actually spending time at the plant. It states: One day designing electric heater. That's on the 9th, but that does not state whether it was at the plant, or in Los Angeles.

Q. Do you remember now?

A. No, I can't, your Honor, prior to these dates we have been [828] checking off, '41 to '43.

Q. We haven't covered April 22 and 24, 1941.

A. April 22, 1941?

Q. And 24.

Mr. L. S. Lyon: I have that checked off in one of these earlier papers.

A. Yes. It is a group of field notes, and a letter referring to it. That remains in the summary, including the years 1939 and '40. I have this group of field notes. Here is a group of notes dated July 21, 1939: First survey, Pacific Imperial Dry Ice Company—

The Court: You need not mind reading what they say. Do they refresh your memory that you were at the plant on the 17th, 19th and 21st?

A. Yes, your Honor.

Q. What about December 1, 3 and 4, '39?

A. I have an additional group of notes indicating another complete survey at the plant.

Q. Are those dates the 1st, 3rd and 4th of December?

A. The heading sheet is dated the 4th, and the underlying sheets show 1, 4, 3; and that's all.

(Testimony of Earl P. Wells)

Q. 1940, April 23, 25, 26, 27?

A. I have a sheet dated April 25, 1940, concerning intermediate pressures at the plant, and test made at that time.

Q. Does that refresh your recollection as to what dates you were at the plant? [829]

A. Yes, your Honor.

Q. Which one? A. 25.

Q. 23 and 25, did you say?

A. I see no sheet here dated 23. Yes. Here is a sheet for 23, '40.

Q. What about the 26th and 27th?

A. Yes; another sheet of test data, with compressor data, the 26th and 27th.

Q. May 13th?

A. May 13, 1940. Yes; a group of power readings.

Q. And June 4, 12, and 14?

A. Yes; a sheet of test data from plant No. 2 showing dates 4th, 5th, and 12th.

Q. 4, 5, and 12? A. Yes, your Honor; it is 5.

Q. What about the 14th of June?

A. I don't notice the reference to the 14th just now.

Q. July 9, 10, 11, and 13?

A. Yes, your Honor. Here, I found it. It is the test sheet of compressor data, 6-14-40.

Q. July 9, 10, 11, and 13?

A. Some test data dated July 10th, 1940, and another sheet, July 9th, plants 1 and 2.

Q. 11 and 13?

A. Here is the notes under July 11th covering tests on [830] inspection of ice quality.

(Testimony of Earl P. Wells)

Q. The 13th?

A. I am unable to locate the 13th, the date 13th here.

Q. August 10 and 21?

A. Here is a test sheet of August 21st.

Q. And 10th? A. Yes; a sheet of test data.

Q. Now, then, you might refresh your memory from the various memoranda which you have indicated, and are you able to say that you visited the plant on July 17, 21; December 1, 3, and 4, 1939; April 23, 25, 26, and 27; May 13; June 4, 5, 12, and 14; July 9, 10, 11; and August 10 and 21, 1940; in March, 1941; April 22 and 24; June 25; July 8 and 9 of 1941; February 25, 1942; March 18 and 19; May 4 and 5, 1943; and April 22, 1944?

A. Yes, your Honor.

Mr. L. S. Lyon: May I ask, your Honor, if the witness could indicate at this time whether or not he knows whether the dates that are specified in the preceding question are the only dates that he visited the plant?

The Court: Well, I think that would be a matter of cross examination.

Q. By Mr. Miketta: Now, Mr. Wells, will you specifically refer to that page or pages of the notes or records to which you have referred which give pressures existing in snow chambers of the snow press? [831]

A. Yes. [832]

\* \* \* \* \*

Q. By Mr. Miketta: Mr. Wells, will you please refer to records showing the pressures in the snow chambers of the [835] presses as you recorded them in 1943 or 1944?

(Testimony of Earl P. Wells)

The Court: I suppose I should say that "building up a snow man" and not a "straw man".

A. I have a notation under April 25, 1940, that snow at 60 pounds. That indicates that the liquid was being injected into the press on that day at the triple point exactly, practically, but that is—

Q. By the Court: When you refer in your notes to 60 pounds, you are just not making any distinction in the triple point; it might be 60, it might be 60.1, .2, .3, .4, .5, something like that?

A. Yes, your Honor. It is correct within a half a pound, but this was just an incidental entry and not an accurate one, because I was not concerned with the exact point involved there.

Q. By Mr. Miketta: Is there any other data pertaining to the snowing operation or the operation of the press on your record there?

A. On that date?

Q. On that date.

May I approach the witness, your Honor, and see his records?

The Court: Yes.

A. There is a notation that the blowback suction pressure was 15 pounds when it was not pumping, but other than that there is no record of the rest of the operation.

Q. By Mr. Miketta: Will you please examine the next [836] subsequent records that you have on pressures in the snow chamber and state what they disclose?

A. I have a notation dated October, 1942, a sort of a chart, showing the snowing time and pumping out time of the H. P. M. press.

(Testimony of Earl P. Wells)

Q. What was the maximum pressure during that operation?

A. There is indication 40 pounds ice. That would indicate that the operator maintained approximately 40 pounds in the press during the snowing period.

Q. And what was the length of time during which liquid was being injected into the snow chamber?

A. That was four minutes; and the pumping out period was two minutes; the pressing period was three minutes.

Q. Did you on the same date observe the operation of the Frick press?     A. Yes. It shows about—

Q. What was the pressure, maximum pressure?

A. The pressure of snowing is not indicated. The snowing time was about a minute and a quarter, and the snowing and pumping out time together were two minutes.

Q. Just in order to clarify the record, I believe you stated that the H. P. M. press had a chamber that horizontally, in horizontal section, measured 20 inches by 20 inches?     A. Yes.

Q. Is that correct?     A. Yes. [837]

Q. What is the same horizontal section of a Frick press?

A. 10 inches by 10 inches. The block is one-fourth the size of the block in the H. P. M. press.

Q. Is there any indication on that record, Mr. Wells, as to when an air vent was opened?

A. I never made any record of that operation because it was so generally practiced in regular procedure that I did not deem it worthwhile.



(Testimony of Earl P. Wells)

Q. What additional records do you have, Mr. Wells?

A. Under the date of February 25th, 1942—I don't know whether that is in sequence or not—H. P. M. operation with plant No. 2. It reads: 11-minute total cycle, 2½-minute snow time at 70 pounds. Also blowback machine will not handle gas for snowing time under 1½ minutes without going over 70 pounds. That just shows the relation between the snowing time and the pump-out compressor capacity.

Q. Does it indicate how long it took for the pressure to drop to atmospheric in the chamber?

A. No. That is the total record.

Under date of March 9th or 19th—I can't be sure—1943, I have an H. P. M. press operation notation which says: Snow three minutes, the liquid pressure of 390 pounds, a liquid temperature of minus 40 degrees. The pressure in the press was 60 pounds for a minute and a half, and at the end of three minutes was 66 pounds.

Q. During what length of time was liquid carbon dioxide [838] injected into the press?

A. Three minutes.

Q. What was the so-called pumping-out time?

A. 1½ minutes.

Mr. L. S. Lyon: If your Honor please, I think, for orderly procedure here, we should know whether the witness is refreshing his recollection, in which case I do not think the form of examination is proper; or if he is supplementing it and has no independent recollection, I think the records themselves must be offered into evidence.

The Witness: Here is the notation of three minutes, your Honor.

(Testimony of Earl P. Wells)

Q. By the Court: In the answers to these were these notes made by you on or about March 19, 1943?

A. Yes, your Honor.

Q. And they were made immediately after you completed the inspection or the tests?

A. Sometime during the day there.

Q. Sometime during that day. And having refreshed your recollection, you are able to give us the data which you have indicated?

A. Yes, your Honor.

Q. The snowing time three minutes, the pumping-out one and a half?

A. And there is a further notation that the press was vented at 20 pounds pressure. [839]

Q. You mean 20 pounds in the compressor line?

A. 20 pounds in the press.

Q. In the press?

A. Yes, sir. The pressing operation took a minute and a half, and one minute additional to take the block out. Marked "blows out liquid line and wipes platen."

Q. What is the time of the entire cycle, then?

A. Seven minutes; and the weight of the block was 240 pounds.

Q. By Mr. Miketta: And you stated, Mr. Wells, that the record speaks of venting the chamber to the atmosphere at 20 pounds. Will you explain at what stage that was vented, and to where and from where?

A. The pressure of the press— [840]

Mr. L. S. Lyon: I don't think the witness said that the record shows that the press was vented to the atmosphere; and I don't see it on the record, and I object to the form of the examination as to what the record shows.

(Testimony of Earl P. Wells)

The Court: The objection is sustained. You ask him. The point, from the standpoint of evidence, is simply this: He may, by refreshing his recollection by those notes, tell you what happened, and you have no right to introduce those in evidence. The plaintiffs may introduce them in evidence if they wish, but you have no right to double-shot. Now ask him it in the other form: Having refreshed your recollection by those notes, or having an independent recollection, at what stage in the cycle was the pressure in the tanks opened to the atmosphere, if any?

Mr. Miketta: I adopt your question, your Honor. Will you answer, Mr. Wells?

A. After the pumping out period, the pressure in the press was vented to atmosphere.

The Court: Read that.

(Answer read by the reporter.)

Q. By the Court: Do you mean the next day?

A. No, sir; at the end of that cycle of snow making.

Q. Immediately forthwith, is that what you mean?

A. Yes, providing the pumping out is limited to pumping down to 20 pounds pressure.

The Court: I wanted the record to show what you meant. [841] I thought I understood it.

Mr. Miketta: From your recollection, as refreshed by these memoranda, will you state whether the chamber was vented before or after the initiation of a pressing operation?

A. The notes show it was after the pump-out period, and before the pressing operation.

Q. Independently of these records, was that customarily what you observed at the plant, Mr. Wells?

(Testimony of Earl P. Wells)

Mr. L. S. Lyon: I object to that upon the ground that as to the word "customarily" no foundation has been laid for it.

The Court: Leave "customarily" out, and answer the question with that out.

A. Yes. I have also notes under date of April 22, 1944.

Q. By the Court: On this same subject?

A. On the subject of snowing cycles, pressures in the presses.

Mr. L. S. Lyon: As to these examinations which were made immediately before the commencement of the trial, your Honor, I would like to object unless it be established what the character of those operations was; whether they were regular operations, or whether they were specially conducted for the purposes of this witness.

The Court: This date was what? [842]

A. April 22, 1944.

The Court: You may examine him on that point on voir dire.

Mr. L. S. Lyon: At this time, your Honor?

The Court: Yes.

Q. By Mr. L. S. Lyon: Do you know whether or not the operations which you observed at the defendants' plant, between April 22nd and April 24th, 1944, were the regular operations of the plant, or some special test that was conducted for your observation?

A. I specifically asked the operator of the press to make a block in his normal procedure, in the same manner he had been making them for weeks previously.

(Testimony of Earl P. Wells)

Q. But you had not actually been at the plant to observe the regular operation since May, 1943, had you?

A. Approximately, yes. It may have been a time later in 1943, but I can't recall it.

Q. Your only knowledge of whether or not these operations were in accordance with the defendants' regular practice, depends on whether or not the operator followed your instructions; is that correct?

A. Yes.

Mr. L. S. Lyon: That is all.

Q. By Mr. Miketta: Was the plant in operation at the time you went to Niland, in April, 1944?

A. Yes. [843]

Q. Was that operation interrupted in order to permit you to observe or take readings on the press?

A. No, I merely walked up to the gauge and started making notes. [844]

\* \* \* \* \*

Q. By Mr. Miketta: Referring to curves 5 and 6, appearing on Exhibit J, Mr. Wells, will you correlate those curves with the data which appears in your records, and as to which you have just referred?

Mr. L. S. Lyon: If your Honor please, I think that is in the nature of cross examination. I think the proper method of proof would be the regular form, as to whether or not he can testify of his own knowledge, or refresh it by records which are identified, as to these values appearing in these curves.



(Testimony of Earl P. Wells)

The Court: I think the question is unfortunate in form, but I think that is what he meant. With that understanding, you may proceed.

A. My record shows that at the end of the first minute of snowing time the pressure in the press was 65 pounds; at the end of two minutes of liquid injection, the pressure was 67 pounds; at the end of three minutes the pressure was 68 pounds. The liquid injection was stopped at the end of three and three-quarters minutes; at the end of four minutes from the beginning of the injection, the pressure was 63 pounds; at the end of five minutes, 61 pounds; at the end of six minutes, 61 pounds; at the end of seven minutes, 49 pounds; eight minutes, 37 pounds; nine minutes, 12 pounds; nine and one-half minutes, 7 pounds. At this point the press was vented, the plunger was started downward, and pressing was completed at the end of ten and [845] three-quarters minutes from the beginning of the cycle. The vent was closed at eleven and one-half minutes; the block was taken out at the end of twelve minutes, and the next cycle was started at twelve and one-half minutes from the beginning of the first one. The block weighed 252 pounds. Then I have a notation that the next block was made—

The Court: For the record, refer to Exhibit J for identification, and show how you portray that cycle on that exhibit.

A. That data is shown as curve No. 6 on Exhibit—J, is it?

The Court: Yes, J for identification.

A. The pressure remains fairly level during the liquid injection period. The liquid curve is closed at the point shown; the pressure dropped approximately 61



(Testimony of Earl P. Wells)

pounds during the period of conversion from liquid to ice. Then the pressure at the end of six minutes dropped rapidly until it reached 7 pounds, at the end of ten minutes, when the vent valve was opened.

Q. By Mr. Miketta: Mr. Wells, does curve 5, shown on Defendants' Exhibit J for identification, correctly represent the recording which you took at the plant on April 22, 1944?

A. My notes do not show exact minute by minute pressure readings for that curve, but merely that the [846] maximum pressure was 75 pounds during the making of this block, and the rest of the curve was reconstructed from my experience in the matter. The maximum pressure there is partly affected by the intermediate pressure of the plant, which affects the capacity of the blowback compressor. When the blowback has to work against a higher head, it pumps at a slower rate, and therefore the pressure in the press rises higher, so these curves are merely typical, and not exact. I can construct a great number of curves by watching the blocks, one after another, as they are made.

Q. Do these curves directly reflect—

The Court: Be more specific. Do these curves 5 and 6—

Q. By Mr. Miketta: I was going to make it inclusive of all of the curves, your Honor. But, do curves 5 and 6, Mr. Wells, correctly reflect the observations which you have taken at the plant?

Mr. L. S. Lyon: That is objected to as indefinite, your Honor, particularly in view of his prior testimony, in which he has stated he has no values for curve 5,

(Testimony of Earl P. Wells)

except the 70 pounds pressure, and the rest of the curve is hypothetical.

The Court: I will ask you the direct question. I think, in so far as curve 6 is concerned, it is already answered that it was plotted from these notes. 5 is theoretical and approximate. Naturally, as there is a [847] relationship between the pressure in the compression line, and the pressure in the tank, you are going to have a variation in the top curve of 6, aren't you?

A. Yes.

Q. So you drew 5 as illustrative of the fact only; it might vary up or down, depending upon the condition in relation to those two items?

A. Yes, with the exception that the flat portion of the curve, around 61 pounds, would remain flat at that point, regardless of the maximum pressure, because of the triple point.

Q. There is the triple point, the flat line?

A. Yes.

The Court: If you are going to ask specifically as to others, do so, but I think you had better take them one at a time, because apparently he cannot answer the question as to all of them. [848]

\* \* \* \* \*

Q. By Mr. Miketta: Mr. Wells, do you have records relating to curve 3, shown on Defendants' Exhibit J for identification? A. Yes.

Q. Does curve 3 correctly represent the observations which you took at the time? A. Yes.

Mr. L. S. Lyon: I think, to save objection, your Honor, we ought to follow the form of examination your Honor indicated before adjournment.

(Testimony of Earl P. Wells)

The Court: I think he will come to it gradually.

What is the maximum pressure indicated by the curve corresponding to curve 3?

A. I have a sequence of readings. At the end of one minute, of the beginning of the liquid injection in the Frick press, the pressure in the blowback line was 25 pounds; that is, at the compressor. At the end of a minute and a half the pressure was 27 pounds; at the end of two minutes it was 17 pounds; at the end of three minutes it was 4 pounds, and then the vent was opened, and the pressure dropped to zero. The liquid injection lasted for a minute [849] and a half, and the pump-out period lasted a minute and a quarter. Pressing required one and three-quarter minutes, making a total of four and one-half minutes. To these pressures I added approximately two or three pounds to give the pressure at the press chamber, because previous experience had shown there was that pressure drop in the line, and because the gauge on the press was broken.

The Court: It was a matter of friction?

A. Yes, friction, your Honor. The block weighed 45 pounds in removal.

Q. By Mr. Miketta: Do you have records corresponding to curves 1 to 2? A. Yes.

Q. Will you refresh your recollection by examining those records, and indicate whether or not curves 1 and 2, shown on Defendants' Exhibit J, correctly reflect the data which you recorded at the time of your observations?

A. The record shows that a block of ice was made at 30 pounds in the press. The liquid injection period, snowing time, was one and one-half minutes; the pumping time was one minute, and four minutes were required for the complete block.

(Testimony of Earl P. Wells)

Q. On what press was that operation?

A. That was the Frick press. Also on the same press triple point ice was made, with a liquid injection period of one and one-half minutes, pumping time one [850] and one-quarter minutes, or a total of three minutes.

Mr. L. S. Lyon: May I ask which curve that is?

A. Curves 1 and 2.

Mr. L. S. Lyon: I can't identify the last operation on those curves, the pumping time, your Honor.

The Court: I am a little confused about that. Will you read the answer?

(Record read by the reporter.)

Q. By Mr. Miketta: In the first part of your answer did you refer to curve 2, or is that a duplicate of curve 2?

A. The 30 pounds ice is indicated in curve 2; the triple point ice is indicated in curve 1.

Q. What was the maximum pressure reached in making triple point ice, as shown on curve 1?

A. The record shows triple point ice snowed below 75 pounds until the last five or ten seconds; then liquid was dumped in to give a hard cake. That was indicated by a little rise in the curve at the 75-pound point.

Q. Do these curves 1 and 2, correctly reflect your observations?             A. Yes.

Mr. L. S. Lyon: That calls for a conclusion, your Honor. I think the record should speak for itself. I notice the record shows, at the time of this operation, with the 30-pounds ice, four minutes, and the curve seems to [851] stop short of three minutes; and the time for the triple operation is stated to be three minutes, and here it seems to stop short of two minutes.

A. The discrepancy is due to the time required to press the block.

(Testimony of Earl P. Wells)

The Court: I understood he was combining the pressing time with the balance of it. Those are not depicted on the curve?

A. The three and four minute periods are not shown on the curve.

Q. By Mr. Miketta: In other words, the curves do not show the time required to press the material after venting the chamber; is that correct?

A. Yes, you take the snow, one and one-half, and one minute for the 30 pounds block and you get two and a half minutes, which the curve shows correctly as the maximum time.

Q. Do you have a record corresponding to curve 4, shown on Exhibit J?

A. I have been unable to locate that sheet from which I made that curve. I had a group of test data under the year 1943, but I found later it included some 1942 data, and the closest data that I could refer to for that curve is the data sheet marked October, 1942, which shows ice being made at 40 pounds instead of 38 pounds, as shown on the graph. [852]

Q. What is the snowing time on that record?

A. The snowing time is shorter in the October, 1942, record than on the graph.

Q. What is the length of time?

A. The data shows four minutes, while the curve shows five and one-half minutes. The data shows two minutes pump-out period, which the graph shows about a minute and a half. This curve, however, is typical of the operation of that sort where the curve shows flat and straight at the top. Actually they are fluctuations, as the operator manipulates a *curve* to maintain the pressure as nearly constant as practical.



(Testimony of Earl P. Wells)

The Court: Sketch October on Exhibit J.

A. On your copy?

The Court: The one in evidence.

Mr. L. S. Lyon: I understand curve 4 does not correspond to any data as in October.

The Court: Ignore that one. I want to get the right one, which he testified to, unless during the course of the trial he is able to find these notes.

Q. By Mr. Miketta: Will you number that curve you have just applied to the exhibit?

The Court: Mark it 4-A.

Q. By Mr. Miketta: Mr. Wells, do these various curves, except No. 4, represent operations which are typical or characteristic of observations which you took at various [853] times on your visits to the plant?

A. Yes.

Q. Will you please examine Defendants' Exhibit H for identification—

The Court: Just a minute. This had better be admitted into evidence as Exhibit J, for the purpose of illustrating the testimony of this witness.

[Note: Defendants' Exhibit J will be found in the Book of Exhibits at page 1368.]

Mr. Miketta: May I hand this to the witness, your Honor?

The Court: Yes. [854]

\*     \*     \*     \*     \*     \*     \*     \*

Q. By Mr. Miketta: Mr. Wells, did you make that drawing?     A. No.



(Testimony of Earl P. Wells)

Q. When did it come into your possession?

A. In 1939, from the Pacific Imperial Dry Ice Company.

Q. Have any changes been made to that drawing since that time? A. No.

Q. Can you state whether that drawing correctly represents the Frick presses which you have observed at the plant of Natural Carbonic Products Company in Niland?

A. It is the same in all general particulars. There have been a few slight modifications made, such as the substitution of leather washers for piston rings in the upper hydraulic cylinder.

Q. Will you identify the major elements of the Frick press, as shown by that blueprint?

A. Will you repeat that, please?

The Court: Will you identify the major elements in the Frick press as indicated by this drawing?

A. There is the central chamber for the pressing of carbon dioxide, which has a vertically moving plunger which rises upward from the bottom of the chamber, that being operated by a piston in a hydraulic cylinder in the lower part of this structure. Above the chamber is a platen which forms a movable head. This platen being moved by a [855] rod connected to a piston in an upper hydraulic cylinder. On the right side facing the drawing are two pipe connections, one for the removal of gas; the other for the introduction of liquid and snow.

Q. By Mr. Miketta: Which of these pipe lines is for the removal of gas, the upper or lower?

A. The upper is for the removal of gas; the lower is for the injection of liquid or snow.

(Testimony of Earl P. Wells)

Q. Is there are vent line shown on this drawing?

A. Yes, there is a valve marked 1-44OR-10858 on the order of a bleeder. It is actually spelled "b-r-e-e-d-e-r", but I believe that is an error in spelling.  
[856]

\* \* \* \* \*

Q. By Mr. Miketta: You have referred to this line. Will you please circle the descriptive matter which you read into the record which identifies the vent line so that can be found on the blueprint?

The Court: I think you had better do it in red so it will show, and then it will be uniform.

A. I will draw a line around the valve just described, which is shown on the right-hand view of the press, and also around the hand wheel, which is shown on the left-hand view of the press.

The Court: All right. Put "W-1" there and "W-2" — "W" for Wells, and that will be the first one you mark, so everyone can see it, and this "W-2". They are the two places there where the vent valve is indicated, is that right?  
A. Yes, your Honor.

Q. By Mr. Miketta: Now will you also apply a mark to the central cross-section shown on the blueprint so as to indicate the location to which that vent line is connected.

The Court: At which.

Mr. Miketta: At which that vent line is connected.

A. Yes. From a drawing standpoint, it could not be [858] shown in the central view because the central view is a section. The left-hand view, which is the same elevation of the press, is a frontal view and therefore the hand wheel can be shown.

(Testimony of Earl P. Wells)

Q. By the Court: The valve is inside and the hand wheel is on the outside; that is all that appears photographically, is that right?

A. Yes, your Honor. Well, the valve in the central view would be toward the observer and therefore could not be shown by the man making the drawing; but it is clearly shown in the right-hand view.

Q. By Mr. Miketta: Have you recently compared that blueprint, Exhibit H, with the Frick presses at defendants' plant? A. Yes; I have.

Q. Does that drawing correctly picture each of the two Frick presses at the plant?

A. Yes; it does, with the exception which I mentioned before of the upper piston and the further difference that the liquid inlet valve is now a cock type valve instead of a needle valve.

The Court: It has nothing to do with the record, but will you please explain to me the difference between a cock type valve and a needle valve in language that I can understand?

The Witness: Perhaps you have seen a valve in a gas line [859] on a gas meter, which is a plug with a slot through it and you turn the plug 90 degrees and close the line.

The Court: Yes. That is about the simplest form?

The Witness: Yes.

The Court: Yes.

A. That is a cock type valve.

The Court: All right. And then tell me what a needle valve is.

The Witness: A needle valve is similar to a globe valve, except that instead of having a flat disc closing the valve stem has a pointed enlargement which fills the

(Testimony of Earl P. Wells)

hole of the port, the purpose being that if the valve is open slightly, a small quantity of fluid will flow, whereas with a globe type valve with a flat disc, a slight opening might give a large flow.

The Court: I had one of those on my Willys-Overland a number of years ago, so I know what it is now. I didn't know what it was called. I had to take it out at the top of the Sierras so I learned all about that needle valve.

Q. By Mr. Miketta: Mr. Wells, have you personally seen anybody install a new sealing gasket on the H. P. M. press? A. No; I have not.

Q. Have you seen a new sealing gasket on the H. P. M. press during your various visits down to the plant?

A. No; only heard that they had been worked on.

Mr. Miketta: That will be all, your Honor. I would like [860] to introduce that Exhibit H for identification for the purpose of illustrating the witness' testimony.

Mr. L. S. Lyon: I would like to object to it for any other purpose, and ask that the legends appearing at the lower right-hand corner be excluded, if your Honor please.

The Court: Everything is excluded except that that illustrates his testimony. It is received only for that limited purpose. [861]

\* \* \* \* \*

#### Cross-Examination

Q. By Mr. L. S. Lyon: Mr. Wells, will you hand me the sheet on which you have recorded the data which is reproduced as curve No. 6 on the diagram Defendants' Exhibit J? A. (Witness producing paper.)

(Testimony of Earl P. Wells)

Q. Is the handwriting on this sheet which you have handed me your own handwriting? [862]

A. Yes; it is.

Q. When did you make that writing?

A. April 22, 1944.

Q. At the plant? A. At the plant.

Q. Pursuant to whose instructions?

A. Mr. Miketta.

Q. And when did you receive those instructions?

A. Approximately April 15th.

Q. And what were those instructions?

A. To visit the plant and make a record of the actual operation of the presses.

Q. Is this the only operation that you saw at that time?

A. No. I observed several blocks being made but they were all so similar in pressure that I did not record them.

Q. And the weight given on this record for the block produced on that particular operation is 252 pounds. What was the dimension of the block?

A. I don't know the exact height. The width and length were 20 inches.

Q. Well, as nearly as you can specify the height, what was the height?

A. I would judge it to be around 11 or 12 inches.

Q. Well, was it 11 or 12? A. I don't know.

Q. Are you sure it was as much as 11? [863]

A. I couldn't say. I wouldn't care to say.

Mr. L. S. Lyon: I would like to offer this as plaintiffs' exhibit on cross examination of this witness.

The Court: It may be received as next in order in evidence.



(Testimony of Earl P. Wells)

The Clerk: 14 is the next of plaintiffs'.

Mr. L. S. Lyon: No. 14.

[Note: Plaintiff's Exhibit No. 14 will be found in the Book of Exhibits at page 1343.]

Q. You have no record of any of the times or pressures indicated on the curve 5 represented on Defendants' Exhibit J except a record of a maximum pressure of 70 pounds, is that correct?     A. Yes.

Q. By the Court: That was purely theoretic, anyway, wasn't it?

A. Well, it was just a matter of incidental interest.

Q. By Mr. L. S. Lyon: What did you intend to illustrate by curve 5 as distinguished from Fig. 6 in preparing this Exhibit J?

A. To show the degree of variation which might occur at that point in the cycle in the normal operation of the plant.

Q. Does that show the complete range of operation, the difference between curves 5 and 6, that you are familiar with in that plant?

A. That is the maximum range that I saw during that day.

Q. What about other days, what ranges have you observed?

A. I have been told that the pressures reach 80 pounds.  
[864]

The Court: No, no, no; not what you have been told, only what you have observed.

A. That is the maximum pressure that I have ever observed in the press.



(Testimony of Earl P. Wells)

Q. By Mr. L. S. Lyon: Did you ever observe the manufacture of triple point ice in that H. P. M. press at that plant prior to April, 1944?

The Court: Read that question.

(Question read by the reporter.)

A. I would have to refer to my notes to express an opinion on that.

The Court: Do it during the lunch hour, if you will, Mr. Wells.

The Witness: I can answer that question now, your Honor.

Mr. L. S. Lyon: Excuse me.

A. March 9th or 19th, whichever the record is,—there is a hole punched here—H. P. M. press—

The Court: Of the year 1941? A. '43.

The Court: '43.

A. —my record shows pressures varying from 60 to a maximum of 66 pounds.

Q. By Mr. L. S. Lyon: And do you have the times and the remaining data for the pressure curve for that observation?

A. Yes. It shows a venting at 20 pounds.

Q. What is the feeding time? [865]

A. Three minutes.

Q. The valve was closed at three minutes, and at that time what was the pressure? A. 66 pounds.

Q. And what was the boil-out time?

A. Pump-out period was  $1\frac{1}{2}$  minutes.

Q. Then, what was the boil-down time?

A. Apparently that included the boil-down time.

Q. You have on Exhibit J shown both in curves 5 and 6 following the indication of the time at which the liquid valve is closed, shown a flat extension of the curve

(Testimony of Earl P. Wells)

between approximately 4½ minutes and 6 minutes. That corresponds, does it not, to what is called the blow-out time? A. Boil-out.

Q. Boil-out time? A. Yes.

Q. Then, you have shown a line slanting from about 60 pounds down to about 5 or 7 pounds over a period of 6 to 10 minutes. Does that correspond—

The Court: You mean between 6 and 10 minutes, a period of 4 minutes.

Mr. L. S. Lyon: A period of between 6 and 10 minutes, yes.

Q. That represents what is called the boil-out time—or blow-down time, is that correct?

A. Pump-out period, I would call it. [866]

Q. Pump-out period, or sometimes called a boil-down period, is it not?

A. I have never heard that term.

Q. What determines the length of that pump-out time in the defendants' operation as you have observed it?

A. It is largely affected by the number of pump-out compressors in use. The plant has two compressors and when they wish to increase production they shorten the press cycle by using two pump-out compressors, which has a penalty, of course, of higher power consumption and therefore is not resorted to unless maximum production is desired.

Q. The higher the back-pressure on the pressure system to which the compressor is connected at that stage, the longer the pump-out time, is that correct?

A. I should say it would be the reverse, because the pump-out compressor pumps more gas at higher pressure, higher suction pressure, therefore, if it is pumping a greater quantity of gas during the liquid inlet period, it

(Testimony of Earl P. Wells)

will have less to pump out during the remainder of the period.

Q. Have you ever observed any other operations in the manufacture of dry ice with the same type of press, H. P. M. press? A. Yes.

Mr. Foster: Objected to as immaterial and not proper cross examination.

The Court: Objection overruled. [867]

Q. By Mr. L. S. Lyon: Is the length of pump-out time in the operations that you have seen with the H. P. M. press at the defendants' plant at Niland similar or substantially longer than your observations of the same press used elsewhere?

A. I have never timed a press operation of any other plant in this manner.

Q. By the Court: Well, it would depend upon how many compressors they hitched up and what the pull was, wouldn't it? A. Yes, your Honor.

Q. By Mr. L. S. Lyon: Referring to curve 4-A on Exhibit J, what press was that operation conducted on?

A. That was the H. P. M. press.

The Court: Then, put a little legend on this one, too, "4-A" over there, with "October" so that we have that complete. I neglected that.

(Witness marking on diagram.)

Q. By Mr. L. S. Lyon: In that operation from which you have drawn the curve 4-A how was the pressure maintained of approximately 38 pounds for the period from one minute to four minutes?

The Court: About one-half a minute. You mean the beginning of that straight line?

Mr. L. S. Lyon: Yes.

(Testimony of Earl P. Wells)

The Court: That is nearer a half minute. Yes.  
[868]

A. That was made by throttling the—let's see.

The Court: Read that question.

(Question read by the reporter.)

The Court: How was it maintained is his question.

A. Maintained, yes. That was done by throttling the liquid inlet valve by manual manipulation of a lever.

Q. By Mr. L. S. Lyon: How was the outlet valve set at that time?

A. To the best of my knowledge, it was wide open.

Q. By the Court: Remaining constant?

A. Yes, your Honor.

Q. By Mr. L. S. Lyon: Will you explain what you mean by your statement that the inlet valve was throttled and what the effect of so throttling the inlet valve would be on the pressure in the chamber?

A. Well, since the pump-out compressor is tending to pull a vacuum in the press, the amount of liquid permitted to enter will raise that pressure to any desired point. By manipulation of the valve a pressure can be maintained fairly constantly.

Q. Was this operation which you have represented in Fig. 4-A on Exhibit J conducted under the same circumstances or instructions to the workman as in the case of the operation which you have represented on curve 6 on the same exhibit; that is to say, did you ask the workman to operate the apparatus in his regular manner or was this specially [869] staged?

A. I don't remember the occasion of making that data. It may have been a regular operating period or it may have been an experimental period.

(Testimony of Earl P. Wells)

Q. Does curve 6 on this Exhibit J represent the only operation of the H. P. M. press for which you have data sufficient to draw such a time-pressure diagram where the operation was conducted under your instructions that it be a regular operation as distinguished from some specially staged test?

A. I don't remember the occasions for making the other records there, except that in general my interest in the press operation was concerned only with its effect upon the blowback compressor capacity and other parts of the system, because I had no contracts at any time to do work on the presses.

Q. Will you produce the record from which you have testified as to curve 3 on Exhibit J, the record for April, 1944?

A. (Witness producing paper.)

Q. Was this in your own handwriting?

A. Yes.

Q. Was it made at the plant at the time of the operation on April 22, 1944?

A. Yes.

Q. And was made on the Frick press? [870]

A. Yes.

Mr. L. S. Lyon: I will ask that this record be received into evidence as plaintiffs' Exhibit 15 on cross examination.

The Court: So ordered.

[Note: Plaintiff's Exhibit No. 15 will be found in the Book of Exhibits at page 1344.]

Q. By Mr. L. S. Lyon: At that time was the Frick press on which that operation was conducted in regular use in the plant?

A. No; it had not been in use for six months to my knowledge.



(Testimony of Earl P. Wells)

Q. What was the name of the workman that operated the press for that demonstration?

A. Mr. Brown.

Q. Who?                    A. Brown.

Q. What were your instructions to Mr. Brown for that operation?

A. To put the press into operation and make a block of ice.

Q. Did you tell him how?                    A. No.

Q. From your knowledge of that particular device, it was susceptible of operation in various manners, was it not?                    A. Yes.

Q. Will you produce the record from which you testified as to curve 4-A on Exhibit J?

A. (Witness producing paper.) [871]

Q. Is this in your handwriting?                    A. Yes.

Q. And when was the record made?

A. The date of the record is not shown but there is a date of October 4, 1942, above the press data.

Mr. L. S. Lyon: I ask that this be received into evidence as Plaintiffs' Exhibit 16 on cross examination.

The Court: It may be received as Plaintiffs' Exhibit next in order.

Q. By Mr. L. S. Lyon: Will you now produce the record from which you testified as to curves Nos. 1 and 2 on Exhibit J?

A. This data includes considerable other data.



(Testimony of Earl P. Wells)

Q. Any of it confidential?

A. I believe that there is nothing there which is of any concern. Pardon me. Is that dated? No date, but it was torn from a bound copy. In July 21, 1939.

Q. Is this record in your own printing?

A. Yes.

Q. And when was it made; at the time of the operations at the plant?

A. At the plant on July 1st.

The Court: Take this blue pencil and indicate what portions of that are applicable.

The Witness: I have already done it, your Honor.

The Court: In red, all right; and the balance of it will [872] be excluded as just cluttering up the record, unless later someone wants it for some other purpose.

Mr. L. S. Lyon: I will offer that portion for the record indicated by the red notation "used for graph" as Plaintiffs' Exhibit 17 on the cross examination of this witness.

The Court: It may be received and so marked.

[Note: Plaintiff's Exhibit No. 17 will be found in the Book of Exhibits at page 1345.]

Q. By Mr. L. S. Lyon: As I understand it, you do not recollect the circumstances under which these operations recorded on Exhibit 17 were made with respect to whether they were regular operations or specially staged operations, is that correct? A. Curves 1 and 2?

The Court: Which is Exhibit 17.

Mr. L. S. Lyon: That is this last exhibit.

(Testimony of Earl P. Wells)

A. Curves 1 and 2 were noted as typical operation in 1939, it being understood that one type of ice was made in the summer time and one in the winter time.

Q. You don't know any more about whether or not they were typical than what you were told, is that correct?

A. I observed them making ice in the summer of 1939, but I did not make a special note as to what type of ice they were making on that date.

Q. You have referred to the type of ice. Will you explain what you mean by that?

A. Whether it is made below the triple point or above [873] the triple point during the liquid injection period.

Q. What difference does that make in the ice?

A. The particles of solid are smaller if the liquid is injected below the triple point than above the triple point.

Q. Does that impart any particular characteristics or property to the ice, that difference?

A. It is not of great importance. If the ice is perfectly pure, the crystals will grow to a large size quicker if made above the triple point than below, because they already start out with larger particles.

Q. Do you know why the practice has been followed in this plant at Niland since 1939 and, as I understand you, up to date between the making triple point ice at one time of year and the snow ice at the other time of year?

A. I don't believe or I don't know that that is the rule at the present time. That was the—

Q. How long ago did you know of it being a rule?

A. At the time the plant was installed.

Q. Do you know whether or not that practice has been followed since?

A. No; I don't.

(Testimony of Earl P. Wells)

Q. When you say "the plant installed" you mean when you placed the revamped plant in operation?

A. Yes.

Q. That practice was being followed up to what date to your knowledge? [874]

A. I can't say. At that time the operators were making different kinds of ice more or less according to their own ideas, without much supervision.

Q. Did you ever direct the defendant as to what type of operation to conduct in the plant at Niland?

A. I gave them no advice or instructions as to regular operation of the press.

The Court: At this time we will take our midday recess, adjourning until 2:00 o'clock.

(Whereupon a recess was taken until 2:00 o'clock p. m. of the same day.) [875]

## AFTERNOON SESSION

2:00 O'CLOCK.

(Parties present as last noted.)

The Court: You may proceed.

EARL P. WELLS,

recalled.

Cross-Examination

resumed.

Q. By Mr. L. S. Lyon: Referring to curve No. 1 on Exhibit J, at what point was the liquid valve closed on that curve?

The Court: The inlet valve?

Mr. L. S. Lyon: The inlet for the liquid, your Honor.

(Testimony of Earl P. Wells)

The Court: Oh, "liquid". I did not hear that word.

A. On curve 1 the valve was closed at the end of a half a minute from the start of opening.

Mr. L. S. Lyon: I did not hear that answer, please.

(Answer read by the reporter.)

Q. You are relying on your recollection for that entirely? A. My records show that.

Q. Refer to Exhibit 17, which is the record that you produced for that curve, and will you point out where on that record it shows?

A. Yes; triple point ice snowing one-half minute.

Q. Then, the bottom of these two lines is curve No. 1?

A. Yes. This whole row is Fig. 1. The first row of [876] figures is curve 2.

Q. Then, what time is indicated by the bottom of curve 1 as it appears on Exhibit J?

A. One and three-quarter minutes.

Q. And that is the total of?

A. The sum of one-half and one and one-quarter.

Q. And on Exhibit 17 the half minute is noted under the legend "snowing time". What does that mean?

A. Well, that means the mere period during which the liquid valve is open. I had to use that common caption, because otherwise I would have had to differentiate between the two types of ice. Actually snowing occurs only during the 30-pound ice-making condition.

Q. You have two legends here: One "snowing time" and one "pumping time," and the data for curve No. 1 under "snowing time" is one-half minute and under "pumping time" is one and a quarter minutes, is that correct? A. Yes.

(Testimony of Earl P. Wells)

Q. Actually there was no snowing occurring in the operation depicted in curve No. 1 during that first half minute; that is correct, isn't it?

A. No; the —no snowing. The liquid valve was open during that half minute period.

The Court: Read that question again, please.

(Question read by the reporter.)

A. There was no snow formation during that half minute [877] period, but the expression I used was common to the trade at that time.

Q. By the Court: By "snowing" you simply meant that was the time that the inlet valve was open?

A. Yes, your Honor.

Q. By Mr. L. S. Lyon: And when did the snowing actually start in that operation?

The Court: You mean 2 or 1?

Mr. L. S. Lyon: In the operation represented by curve No. 1.

A. The conversion from liquid to snow occurred after the pressure in the press dropped below the triple point during the pumping-out period.

Q. Then, the liquid CO<sub>2</sub> actually remained liquid in the press from the end of the first half minute shown on curve 1 down to the end of the full minute shown on curve 1, is that correct?

A. Approximately. Since I took no readings during the interval from a half minute to a minute and a quarter, the curve is not exact during that period, and actually there probably was a slight hump or flattening out at the 60-point line during that operation.

Q. Actually the only readings you have for curve No. 1 so far as time is concerned is a reading at a half a



(Testimony of Earl P. Wells)

minute and a minute and a quarter; that is correct, is it not?

A. Those are the only time intervals at which I measured [878] this.

Q. And the shape of the curve between those two times is hypothetical, is it not?

A. It is rough, yes; it is approximate.

Q. You do not believe it was a straight line?

A. I believe it was not a straight line.

Q. Referring to curve 2 on this Exhibit J, do your records show where on that curve, at what time on that curve the liquid inlet valve was closed?

A. Yes; at the end of one minute and a half.

Q. And what was occurring during that minute and a half in the operation?

A. Snow was being formed in the chamber.

Q. And then what was occurring during the following minute, which you have under the legend "pumping time"?

A. Gas was being removed from the chamber.

Q. Do you have any readings for that curve other than those two, the minute and a half and the one minute?

A. No; those were the only two readings.

Q. The shape of the curves between those times also is assumed, is it not?

A. Yes. It is approximately correct.

Q. Do you know of the defendants in this case, any of them, actually employing an operation corresponding to either curves 1 or 2 on Exhibit J since you revamped the plant at Niland in the spring of 1940? [879]

A. I don't know which operation they use regularly. I know that they have made ice under both conditions,



(Testimony of Earl P. Wells)

but whether it was regular operation or experimental operation I don't know.

Q. Can you point to a record in your papers here, or have you a record of any such operation by the defendants since the spring of 1940?

A. You mean as a regular operation?

Q. Have you a record of such an operation in that plant since the spring of 1940?

A. I don't know without looking.

Mr. Miketta: Objected to, your Honor, as not identifying the press in which the operation was made.

The Court: Any one of the three presses.

A. The questions previously were all concerned with the Frick press. I wonder if the attorney means the same press?

Q. By Mr. L. S. Lyon: Have you a record for such an operation, in the spring of 1940, in that plant, for any of the presses?

A. There is a notation of October, 1942, of a snowing operation.

Q. Will you produce that record, please?

A. That has already been submitted in evidence, I believe; the bottom sheet.

The Court: That is the 4-A curve?

A. Yes, your Honor. [880]

Q. By Mr. L. S. Lyon: Have you any other record of the snowing operations since the spring of 1940, in that plant?

A. No, not for that type of operation.

The Court: Just what do you mean by that?

A. For the low-pressure ice.

Q. Have you any for the triple point?

A. Yes.

(Testimony of Earl P. Wells)

Q. By Mr. L. S. Lyon: Have you any records showing what type of operation was employed in the defendants' plant at Niland, since you revamped that plant, from the spring of 1940 up to your records for your operations in 1944, except the record from which you drew curve 4A?

A. March 19, 1943, is an operation on the H. P. M. press, making triple point ice.

Q. Was that a specially staged experiment, or a regular operation, so far as you know, if you know?

A. There is no notation here of whether it was a regular operation or special, and I don't recall.

The Court: Just a moment, please. Mr. Wells, in your answer, what was your distinction between the regular operation and a special operation? Is there any difference in the method employed?

A. We conducted various operations of a press for various purposes other than the production of ice. For example, to determine the effect of the pumping rate upon the rest of the plant, which affected the use of other parts [881] of the plant. There were other experiments which we performed in connection with purification of the gas. That is what I mean by special.

Q. Don't your records show whether you were making one of those tests, or whether you were making ice?

A. This page indicates that this record was incidental to some other pressure readings of the various compressors. Here is a conclusion I have on the center of this sheet: Plant No. 2 CO<sub>2</sub> condenser operates at 6 to 8 degrees higher condensing pressure than No. 1 condenser. Cause unknown. I don't recall the relation between the press cycle and that problem at that time. It may have

(Testimony of Earl P. Wells)

been taken just to complete my records for other purposes, in case I needed them.

Q. How were you going to determine that question if you did not run the cycle?

A. That I didn't run the cycle?

Q. I say, how were you going to determine that without running the cycle? Wasn't that the only way you would have been able to determine the time difference between the condensers? Is there any artificial way you could have measured that?

A. No, there doesn't seem to be any relation between this condenser pressure and this press cycle.

Q. I don't mean that. You make the statement there that there was a difference between the two compressors, No. 1 and No. 2. [882]

A. Condensers?

Q. Condensers, I meant. How were you going to determine that without going through the operation cycle?

A. That is a conclusion, apparently, from other data on the same page, which shows condensing pressures and compressor pressures, and temperatures, so that conclusion evidently referred to other data on the sheet, rather than to press cycles. [883]

Q. Did you from time to time conduct special demonstrations, or experimental operations, in that plant, in which you employed different times and different pressures from those which were employed in the regular commercial operations of the plant?

A. Will you read the question?

(Question read by the reporter.) A. Yes.

Q. Referring to this Exhibit 16, which, as I understand it, is the exhibit from which you drew, curve 4-A, on Exhibit J, can you tell us whether or not that is a record of a regular operation of the plant, or of one of

(Testimony of Earl P. Wells)

these special tests or demonstrations that you were conducting?

A. I couldn't say. There is nothing on here which indicates that it was a regular or special operation.

Q. Will you refer to this record, Exhibit 16, and to the curve 4-A, and indicate to the court just which points on the curve are actually established by that record, and which points on the curve are hypothetical or extrapolated?

A. There is only one pressure shown on this data, which is 40 pounds, and that indicates that the pressure was maintained at 40 pounds during the snowing operation; that at the end of that operation the pressure would naturally drop to zero, if permitted to go all the way. [884]

Q. Do your records show whether or not it was permitted to go all the way?

A. There is no further pressure record.

Q. Then the curve from the period marked four minutes on this curve, 4-A, from there to six minutes, is entirely hypothetical, is it not?

A. Yes, it is indefinite, but approximate.

Q. Can you answer my preceding question, as to whether or not you have in your records any data from which you can construct curves showing the operations in defendants' plant from the time you revamped it, in the spring of 1940, up to April, 1944, other than this Exhibit 16?

A. I think I previously answered that same question under date of March 19th.

Q. Anything else?

A. What was the first date that you specified?

(Testimony of Earl P. Wells)

Q. Commencing with your revamping of the plant?

A. This notation on February 25, 1942, shows the H. P. M. operation, having a snow time of two and one-half minutes at 70 pounds. Actually, that was not snowing, of course, at that pressure.

Mr. L. S. Lyon: I will ask that the record just identified by the witness be received in evidence as Plaintiffs' Exhibit 18.

The Court: It may be so received.

[Note: Plaintiff's Exhibit No. 18 will be found in the Book of Exhibits at page 1347.]

Q. By Mr. L. S. Lyon: There isn't sufficient data [885] on Exhibit 18 to enable you to draw a time pressure curve for that operation, is there?

A. Not an accurate curve, no.

Q. Have you any further records in answer to my question? A. No.

Q. Your answer includes the records you have in the court room, as well as any other records that you know of that you have; is that correct? A. Yes.

Mr. L. S. Lyon: That will be all.

Redirect Examination [886]

\* \* \* \* \*

Q. Mr. Wells, can you state whether or not you gave the operators any instructions as to the pressures which they were to use in the pressing chambers during their regular operation? A. I did not at any time.

Q. Did you give any such instructions at the times that you were conducting experiments?

A. Yes, the pressures were operated according to my instructions during experimental tests.



(Testimony of Earl P. Wells)

Q. Would you identify those particular experiments at which time you gave such instructions?

A. I can't identify any of those from the records, or from memory, as to whether they were regular or experimental.

Q. From your observations of the snow presses, would you state whether it is possible to press a satisfactory brick of solid carbon dioxide without permitting the pressure in the chamber to drop to zero or atmospheric?

A. No, when the pressure finally reaches zero it will always be formed.

Q. Is it possible to obtain a satisfactory block by pressing snow in the chamber without permitting the pressure to first drop to atmospheric or zero gauge pressure before the pressing actually starts?

Mr. L. S. Lyon: I think there should be some foundation laid, your Honor. I don't think this witness is [887] qualified as an expert, from the operation of presses. I think he has made it clear they were incidental to his work. There has been no foundation laid for this question, as to whether he has any knowledge one way or the other. [888]

Mr. Miketta: If you know.

The Court: Oh, I think he may answer. If he does not know, he may say so. If he does, then you can re-examine him on recross. You may answer.

A. If there is any pressure existing in the snow chamber during pressing, there is a great likelihood of gas pockets at those pressures remaining in the block and causing explosion after the block is removed.

Mr. L. S. Lyon: I move to strike the answer as not responsive, your Honor.



(Testimony of Earl P. Wells)

The Court: Well, read it, please.

(Answer read by the reporter.)

The Court: Therefore, what, in answer to the question?

A. Therefore, a complete whole block could not safely or usually be obtained from the press under those conditions.

The Court: I think that answers it.

Mr. Miketta: That will be all, your Honor.

Mr. Foster: Might I have the court's indulgence for one or two questions?

The Court: Surely.

#### Redirect Examination

Q. By Mr. Foster: Mr. Wells, I notice on this Defendants' Exhibit J with respect to all of these curves, 1, 2, 3, 4-A, 5, and 6, at their terminus they appear to drop substantially vertically and I understand that represents the drop in pressure when the presses are vented to atmosphere, is that [889] correct? A. Yes.

Q. And immediately before that short drop characteristic of each of these curves at their terminus, the curves all decline sharply and that represents the pump-out operation, is that correct? A. Yes.

Q. During your work from 1940 into 1944 at the defendants' plant at Niland, on your trips there the plant, as I understand it, was operating commercially, producing ice for sale? A. Yes.

Q. And during your observations of the defendants' plant in that period when it was operating commercially to produce ice for sale are these short drops at the terminus of each of these curves, 1, 2, 3, 4-A, 5, and 6 of Exhibit J, typical of the pressure drops you observed at such times? A. Yes.

(Testimony of Earl P. Wells)

Mr. L. S. Lyon: I object to that on the ground that it is leading; and second, on the ground that the witness has not shown in any of his records any record of any such drop at all.

The Court: Read that question, please.

(Question and answer read by the reporter.)

The Court: As I understand it, graphically, these simply represent the short distance between two points; you have [890] taken a reading at a certain point and you take a reading in another point, and you just sketch that in for convenience. Actually it is not going to be straight; it is going to be a wavy line. If you did it every second, you would just have that wavy all the way down; is that not correct?

A. Yes. In addition, the curve might have a very slight slope, that is, it might take two seconds for the gas to leave the chamber during the venting period, but the scale does not permit showing it in this short-time interval.

Mr. L. S. Lyon: My objection, your Honor, includes the point it has already been developed by the witness that he made no readings, for example, such as indicated at a pressure of five pounds at two minutes and a half on curve No. 2, or at two minutes and three-quarters on curve No. 3. I inquired about that and there were no records of any such readings. These are extrapolations, and I don't think counsel should put the words into the mouth of the witness that he has done something which, clearly, he has not done.

The Court: I did not so interpret the question. As I understand it, all he wants to know is if the drop experienced is indicated approximately on those drawings as being the drop that you find in the regular course of com-

(Testimony of Earl P. Wells)

mercial manufacture. Is that what you meant by your question?

Mr. Foster: Yes, your Honor; that short drop.

A. It is my impression that the operation was typical.

Q. By Mr. Foster: Is the same thing true, Mr. Wells, as [89] to the last sharp drop in these presses, all three presses at the defendants' plant, immediately prior to the opening of the vent; that is, is the drop in pressure as indicated upon these curves at that time, in curves 1, 2, 3, 4-A, 5, and 6, typical of the drop in pressure you observed during commercial operations at the defendants' plant to produce ice for sale?

A. Yes; it is.

Mr. Foster: That is all, your Honor.

#### Recross-Examination

Q. By Mr. L. S. Lyon: Mr. Wells, do your records show whether you actually made a measurement at the end of six minutes on curve No. 4-A and found the break in the curve there indicated at a pressure of 10 pounds?

A. No; they do not.

Q. Did you make any such measurement?

A. No; I did not.

Q. Is your answer the same for the similar breaks in the curves at the bottoms of all of these curves?

A. I believe my record on curve 6 may show that. Yes; my record on curve 6 shows that the pressure was 7 pounds at the time of venting.

(Testimony of Earl P. Wells)

Q. And that was at what time?

A. At 9½ minutes.

Q. You made no measurements to establish any such point on any of the other curves, is that correct? [892]

A. There was one record of a venting at 20 pounds, and I can't remember whether that was the basis of one of the curves or not. I believe it was. Let's see.

Q. Look at Exhibit J and indicate on which of the curves there is a venting at 20 pounds.

Mr. Foster: May I ask if the witness has or may have before him all of the data sheets you have taken from him and introduced?

Mr. L. S. Lyon: He has them all, your Honor.

A. Date of March 19, 1943, shows the venting occurred at 20 pounds pressure. [893]

\*   \*   \*   \*   \*   \*   \*   \*   \*

Q. This record of March 19, 1943, is the one you explained to the court with reference to these values in the compressor system?     A. Yes.

Q. And in which you said that you did not know whether there was any relation between the press operation and the notes or values given for the compressor system?     A. Yes.

Q. Now, then, do you know whether or not this press cycle operation for which the data is given on this sheet for March 19, 1943, was a special demonstration for your own observation or was a regular operation in the plant?

A. I don't know.

(Testimony of Earl P. Wells)

Mr. L. S. Lyon: In view of the fact that I have referred further to this last sheet, I would like to have it in evidence, your Honor.

The Court: It may be received and marked as Plaintiffs' next in order.

Mr. L. S. Lyon: A record which the witness has produced of the operation dated March 19, 1943.

The Witness: May I inspect it first? May I see if there [894] is any other data attached there?

Mr. L. S. Lyon: If there is any data on there, I would be perfectly willing you should read in the material that pertains to the press cycle.

The Witness: This is an entirely different matter attached to it (detaching sheet).

Q. By Mr. L. S. Lyon: There is nothing in this first sheet?

A. Nothing, you mean, in regard to the press?

Q. No; I mean nothing confidential in this one?

A. No.

The Court: Nothing extraneous, either, in it?

A. Well, there is irrelevant matter there.

Q. By Mr. L. S. Lyon: The part that refers to the pressures and times and the press cycle is indicated by the red line?

A. Yes.

Mr. L. S. Lyon: I ask that this be made plaintiffs' exhibit next in order.

The Clerk: 19.

[Note: Plaintiff's Exhibit No. 19 will be found in the Book of Exhibits at page 1349.]

(Testimony of Earl P. Wells)

Mr. Foster: The part indicated by the red line only, I suppose, your Honor.

The Court: Yes. Any further questions?

Redirect Examination

Q. By Mr. Miketta: Mr. Wells, did I give you instructions as to what pressures to employ in the snow presses on the date of your last visit to the plant? [895]

A. Your only instructions were to record the pressures as they were actually observed in regular operation of the plant.

Mr. Miketta: That will be all, your Honor.

Mr. L. S. Lyon: No further question.

\*   \*   \*   \*   \*   \*   \*   \*

The Witness: Yes, your Honor. I understand that this data as submitted as evidence, is it to remain my property?

The Court: May it be stipulated that photostatic copies may be substituted for the original sheets and that they may then be returned by the clerk to Mr. Wells for his records?

Mr. Miketta: Thank you, your Honor. So stipulated.

The Court: So stipulated?

Mr. L. S. Lyon: Yes, your Honor. [896]

\*   \*   \*   \*   \*   \*   \*   \*



FRANK S. HADFIELD,

called as a witness on behalf of defendants, being first duly sworn, was examined and testified as follows:

The Clerk: State your name, please.

A. Frank S. Hadfield, H-a-d-f-i-e-l-d.

Direct Examination

Q. By Mr. Miketta: Mr. Hadfield, will you please state your present occupation and position?

A. I am president of the Associated Refrigerating Engineers of Los Angeles.

Q. And for how long have you been president of that organization? A. Since October, '38; 1938.

Q. Will you describe the type of work that is done by your organization?

A. We are engineers and contractors of refrigerating plants, such as ice plants, water-ice plants, cold storage plants, dry ice plants, quick-freezing plants.

Q. What technical training have you had, Mr. Hadfield?

A. I was graduated from the University of Illinois in 1904 with a B.S. degree, took postgraduate work in 1905, and received a mechanical engineer's degree.

Q. In your work you studied machine design?

A. No; refrigerating plant design.

Q. Will you please state some of the other positions or associations that you have had prior to 1938? [898]

A. Well, from 1921 until 1938 I was with the Gay Engineering Corporation as engineer and estimator, production manager, and general manager.

Q. And prior to 1921 what were your duties and occupations?

A. Well, I had charge of a municipal light and water plant in Michigan, and was a mechanical engineer for the

(Testimony of Frank S. Hadfield)

Globe Soap Company at Cincinnati for five years, and previous to that worked with an electric light and power company in Illinois.

Q. You mentioned ice manufacture and ice refrigeration. What was your earliest contact with ice as a refrigerant?

A. Well, other than using it, my first contact with the manufacture of ice was about 1910, when I went to Newark and investigated the Holden method of making ice.

Q. Will you please describe what this Holden method was?

Mr. L. S. Lyon: I object, your Honor. This apparently is water ice and not particularly pleaded or not pertinent. It is immaterial in this case. At least we ought to have some more definite application of it before we listen to somebody's method of making water ice in 1910.

Mr. Miketta: It is preliminary, your Honor.

The Court: Well, if you make it short, all right.

The Witness: What was the question, please?

(Question read by the reporter.)

A. Holden made ice by refrigerating a revolving drum and [899] scraping the ice off of the drum and then collecting this ice in a press and pressing it into a block of ice. [900]

\*      \*      \*      \*      \*      \*      \*      \*

Mr. Miketta: I was going to be very brief on the point.

The Court: Go ahead, and take it subject to a motion to strike.

(Testimony of Frank S. Hadfield)

Q. By Mr. Miketta: Mr. Hadfield, will you state whether you have seen ice crystals pressed into blocks.

A. Yes.

Q. When did you first see that done?

A. That was approximately 1910.

Q. Is that practice still being employed in the manufacture of ice blocks?

Mr. Morris: Is this in relation to water ice? I did not understand whether the question was addressed to water ice or not.

Mr. Miketta: Yes, water ice crystals.

A. Water ice.

Q. Is that still being done, Mr. Hadfield?

A. Occasionally; very slightly.

Q. Will you state very briefly the machine or apparatus in which you saw that being carried out, beginning in about 1910? [910]

A. My recollection is very vague of this machine. That was a long time ago; but it was a press, in which these crystals of ice were put, and then the press was operated, and a block, a rectangular block of white ice was made out of the crystals.

Q. In what form were the crystals when they were admitted into the press?

A. Small ice crystals that had been scraped off of a drum.

Q. Just how were they moved into the press?

A. They were moved in under steam water.

Q. Was there an outlet to the press?

A. Yes, there was an outlet provided for the water that was squeezed out of the ice, and mixtures, and, of course, an outlet for the ice to go out.

(Testimony of Frank S. Hadfield)

Q. When you say an outlet for the ice, you mean the block of ice? A. The block of ice, yes.

Q. Was the plunger moved toward or away—

A. Yes, the plunger was operated. I won't say whether that was hydraulically operated, or mechanically. I can't remember, but it had to be operated, of course.

Q. Mr. Hadfield, in a press of any type, what is the function of the pressing plunger?

A. To compress the contents of the chamber.

Q. Does that function change if you change the material [911] being pressed in the machine?

Mr. L. S. Lyon: I object to that as too general; no foundation laid. The witness has not been qualified to answer the question.

Mr. Miketta: He is an expert engineer. I think he can answer that question, your Honor.

The Court: I think you are getting into common knowledge. Certainly, it is common knowledge that you have got to apply the pressure, either manually, or by some type of apparatus, like a hydraulic cylinder, and the purpose of that also is manifest. It is to squeeze something out of the material, or to compact the material. There may be nothing squeezed out of it at all. I don't think, when you squeeze cotton ordinarily you get anything out of it.

Mr. L. S. Lyon: If you squeeze cottonseed—

The Court: I have made too much cottonseed oil, not to know that. You may answer. A. No. [912]

Q. By Mr. Miketta: Are you familiar with processes of solidifying carbon dioxide? A. Yes.

Q. Have you ever supervised the installation of presses for solidifying and pressing carbon dioxide?

A. Yes, sir.

(Testimony of Frank S. Hadfield)

Q. Where?

A. At National Dry Ice Company, at Niland.

Q. When?

A. I installed one press in 1936, and another one in 1942.

Mr. L. S. Lyon: I move to strike this testimony unless it is admitted solely to show the experience and qualifications of this witness.

The Court: That is all I understand it is for.

Mr. Miketta: That is correct.

The Court: Overruled. [913]

\* \* \* \* \*

Q. By Mr. Miketta: Have you observed the operations of the so-called snow presses at the plant of the National Dry Ice Company, since 1936? [914]

A. Yes.

Q. Have you and your company done any work for Natural Carbonic Products, Inc., at their plant at Niland, California?

A. We advised them on the setting of the H. P. M. press, early in 1941.

Q. What instructions did you give them at that time?

A. Instructions as to how to pipe up the press to their system.

Q. Will you specify in greater detail what pipes you refer to?

A. The method of connecting the pump-out machine into the press; the method of connecting the liquid supply to the end of the press, and the method of venting it to the atmosphere.



(Testimony of Frank S. Hadfield)

Q. Did the H. P. M. presses come equipped with apertures or holes for all those connections?

A. H. P. M. presses are generally manufactured to the buyer's specifications as to where the openings are to be placed, and the size of the openings.

Q. When was the first time that you saw the H. P. M. press in operation at the plant of defendant, Natural Carbonic Products, Inc.?

A. I think it was the summer of 1942.

Q. Have you observed that press in operation, making blocks? [915]

A. Yes.

Q. Did you see an air vent in that press?

A. Yes.

Q. Was that air vent being operated?

A. Yes.

Q. From your experience with snow presses, Mr. Hatfield, what would your reaction be if you saw a snow press without an air vent?

A. I wouldn't operate it.

Mr. L. S. Lyon: I object to that as not a proper form of question. I don't know what he means by what his reaction would be.

The Court: Objection sustained.

Mr. Miketta: Let me rephrase it, your Honor:

Q. From your experience, Mr. Hatfield, would a snow press without an air vent be capable of producing a satisfactory block?

A. No.

Q. Will you state why?

A. There is too much danger of pressure accumulating in the chamber due to a number of causes, that would make it not only dangerous to operate, but would probably produce a tension in the block that would cause it to explode when it was ejected from the press.

(Testimony of Frank S. Hadfield)

Q. Have you seen any such explosion, or disfiguration of the block? [916]

A. I haven't seen the block explode, but I have seen the pressure accumulate in the press, because in the making of snow ice we quite often get stoppage in the pump-out line, due to the presence of snow in that line, and this stoppage may or may not be indicated on the gauge, but if the vent is opened to air immediately that pressure, of course, is noticed, because we get a very heavy out-rush of gas from the chamber due to the pressure that is still up in there. [917]

Q. At what stage of the operation is the air vent opened?

A. The air vent is opened before the pressing of the block is started.

Q. When is the last time that you visited the plant of Natural Carbonic Products?

A. April 25, 1940.

Q. Was the H. P. M. press in operation at that time?

A. Yes. [918]

\* \* \* \* \*

Q. By Mr. Miketta: Mr. Hadfield, did you take any readings of pressures and times, or the pressure and time relationships existing in the press while on your last trip down to the plant? A. I did.

The Court: Now, don't you see why a question like that is perfectly proper and just good sense and moves things along. The other one may be strictly all right from the technical standpoint, but it just wastes a lot of time.

Q. By Mr. Miketta: Did you make any records of your observations at that time? A. I did.

(Testimony of Frank S. Hadfield)

Q. Will you produce them, please? May I confer with the witness, your Honor?

The Court: Yes, sir. Counsel for the plaintiffs may also.

Mr. L. S. Lyon: These are some more records that have not [919] been submitted to us, your Honor.

Q. By Mr. Miketta: Are these in your own handwriting, Mr. Hadfield?     A. Yes.

Q. And they were made at the time?     A. Yes.

Mr. L. S. Lyon: May I ask, your Honor, why these records have not been submitted to us for our consideration? If we are going to have cumulative evidence here, if it be submitted, it would certainly help to save some time as the witnesses come along.

The Court: Yes. I think they should be submitted if they are going to be used, in order that we do not have to stop and have them examined.

Mr. Miketta: May the court please, I did not even know that the witness had these records in his possession until this noon.

The Court: Go ahead, then. That is sufficient excuse.

Q. By Mr. Miketta: Did you give the operators any particular instructions when you were taking those readings, Mr. Hadfield?     A. No.

Q. Did you announce yourself to anyone or to the operator at that time?     A. No.

Q. Do they correctly state the times and pressures which [920] you observed?     A. Yes.

Mr. Miketta: I ask that they be introduced in evidence, your Honor, as defendants' next exhibit.

Mr. L. S. Lyon: We object on the ground it is not the proper method of proof.

The Court: Objection sustained.

(Testimony of Frank S. Hadfield)

Mr. Miketta: May I have them marked for identification?

The Court: Yes; they may be marked for identification.

The Clerk: Mark them all as one exhibit, your Honor?

Mr. Miketta: All as one exhibit; yes.

The Court: Yes; if that is satisfactory to counsel.

The Clerk: Exhibit K for identification.

[Note: Defendants' Exhibit K will be found in the Book of Exhibits at page 1369.]

The Court: You may use them to refresh his memory and the plaintiffs may put them into evidence if they want to, but you can't have the man testify and put in his memorandum, both. That is the point.

Q. By Mr. Miketta: What were the maximum pressures which you observed on the trip to which you have referred?

A. In one operation the pressure was up to 70 pounds; the other operations it was 65 pounds.

Q. By the Court: That is maximum?

A. Maximum.

Q. And was that gauge? A. Guage.

Q. By Mr. Miketta: And during those operations was the [921] air vent opened prior to the initiation of the pressing operation? A. Yes.

Q. Did you observe the movement of the lower platen at any time? A. Yes.

Q. Will you please describe whether that was moved during the snowing or pressing operation?

(Testimony of Frank S. Hadfield)

A. At the start of the pressing operation the bottom platen was dropped approximately one inch before the top platen was operated downwardly.

The Court: Excuse me. Now, I didn't hear that last.

A. That was before the top platen was brought down.

Q. By Mr. Miketta: The top platen is the pressing plunger? A. Is the pressing plunger; yes.

Q. How did you observe the pressures, Mr. Hadfield?

A. Two of the operations I took readings approximately every minute; in one or two cases, every half minute.

Q. And by means of a pressure gauge?

A. A pressure gauge that was on the gauge board at the plant.

Q. Can you state that the operation which you observed was typical of the commercial production or operation of an H. P. M. press in the production of solid CO<sub>2</sub>?

Mr. L. S. Lyon: I object to that as no foundation laid.

The Court: He is laying the foundation. He asked him if [922] he could; and if he says "no", that ends it. If he says "yes", then we will find out. A. Yes.

Q. By Mr. Miketta: Was that operation typical of commercial operations? [923]

\* \* \* \* \*

A. Typical of making triple point ice.

The Court: That is typical—

A. Of the triple point.

Q. —in your judgment, of commercial operations for making triple point production?

A. Triple point ice; yes, sir.



(Testimony of Frank S. Hadfield)

Q. By Mr. L. S. Lyon: In H. P. M. presses, as I understand it?

A. Yes; in H. P. M. presses; that is correct.

The Court: Yes; I so understood it. That was what you meant?

Mr. Miketta: Yes. I think I added that to the question, your Honor.

Q. I believe you testified, Mr. Hadfield, that you first saw that press in operation in the summer of 1942, is that correct? A. Yes.

Q. On your last visit to the plant in April of this year was that press in substantially the same condition in which you observed it in the summer of 1942?

A. Yes. [924]

Q. It had the same connections? A. Yes.

Q. It was provided with the same appurtenances?

A. Yes.

Mr. Miketta: That will be all.

\* \* \* \* \*

### Cross-Examination

Q. By Mr. L. S. Lyon: Mr. Hadfield, when you referred to H. P. M. presses in your testimony you were referring to the product of the Hydraulic Press Manufacturing Company? A. Yes.

Q. Where other than at the defendants' plant at Niland have you ever observed such a press in the process of manufacturing triple point dry ice?

A. The National Dry Ice plant at Niland.

Q. And where else? A. That is all.

Q. Then you have only seen one other of these presses, other than the one at the defendants' plant, is that correct? A. That is right.

(Testimony of Frank S. Hadfield)

Q. How long have you known of the H. P. M. press at the [925] National Dry Ice Company?

A. Since 1936.

Q. It has always been used for the manufacture of triple point ice?     A. No.

Q. Has the defendants' H. P. M. press always been employed for making triple point ice, to your knowledge?

A. I do not know.

Q. Were you asked by someone to make this trip in April of this year to the defendants' plant?     A. Yes.

Q. Who?     A. Mr. Miketta.

Q. Was today the first time that you told Mr. Mocketta that you had made any record of your observations?     A. Yes, sir.

Q. Didn't he ask you to make any record when you went down?

A. He asked me to observe the pressures and times.

Q. And didn't he ask you to record them?

A. No.

Q. You had no discussion with him about whether you were going to make any notation of your observations?

A. He didn't tell me to make a notation. I suppose he assumed I would. I don't know what he assumed.

Q. You assumed he intended you to, did you not? [926]

A. Whenever I am sent out to observe an operation I make notations, of course.

Q. And you made no report to Mr. Miketta of the results of your trip until today?

A. He asked me if I had been down there and I told him I had; yes.

(Testimony of Frank S. Hadfield)

Q. But he did not ask you what you had seen?

A. No.

Q. You did not make any report to him at all?

A. No.

Q. When did you first see him after you came back?

A. Well, I don't know. It must have been about ten days ago, probably.

Q. Tell us just what instructions Mr. Miketta gave you before you went down.

A. Just to observe the operation of the press and the pressures and the times.

Q. He asked you to particularly observe the times and pressures? A. Yes.

Q. How long before you actually made the trip was this request made of you? A. One or two days.

Q. Who operated the H.P.M. press on the occasion of these readings that you took?

A. The name is on one of those sheets there. I forget it. [927]

Q. A man named Bradford? A. Bradford; yes.

Q. How long were you there?

A. From about 10:00 o'clock in the morning until about 11:30.

Q. How long after you returned did you report to Mr. Miketta? A. I didn't report to him.

Q. Did you see him? A. I saw him.

Q. How did you come to see him?

A. He asked me to come up to his office.

Q. Did you have any discussion relative to your trip?

A. No. [928]

(Testimony of Frank S. Hadfield)

Q. By Mr. L. S. Lyon: Did you tell Mr. Miketta what you had done down there?

A. I told him I had been to the plant.

Q. Anything else? A. No.

Q. Did he ask you what you—

A. We didn't discuss that at all. We didn't discuss the readings. He didn't see the readings.

Q. Did you tell him you had made the readings?

A. I don't think I was asked. I don't think I told him. Our discussion was about other matters entirely and not about those readings.

Q. Did he ask you particularly to observe the opening of the valve that controlled the venting to the air, to the atmosphere?

A. He asked me to make a sequence of the operations, to [929] make sure of the sequence of operations of opening the valves.

Q. What was the pressure in the chamber at the time that the vent was opened to the atmosphere?

A. 5 pounds.

Q. How long did it require to pump out the gas down to that point?

A. It varied somewhat. The times are all on those sheets. If I may have them, I can tell you.

Q. Can you give me this information without this sheet? A. Not exactly.

Q. Well, can you tell?

A. Approximately 3-1/2 minutes snowing time.

Q. Approximately what time was the liquid feed opened in this operation? A. 3-1/2 minutes, about.

Q. What time of day?

A. One test started at 10:20, another test started at 10:35.

(Testimony of Frank S. Hadfield)

The Court: Well, I am not interested as between 10:00 and 10:30.

The Witness: Do I have to remember all those? Three or four tests were made in the morning.

Mr. L. S. Lyon: I am interested in the situation in so far as the court is to be urged that it was contemplated that this man would testify from memory here today, instead of [930] having in his possession a memorandum to testify from.

Mr. Foster: I object to Mr. Lyon putting words in the mouth of my associate. He has not made any contention like that at all.

The Court: That is correct; and we are not trying Mr. Miketta. We are trying a lawsuit now. He is entitled to look at his memoranda to refresh his memory, if he wants to.

Q. By Mr. L. S. Lyon: You have referred to the water ice press that you used in 1910.

A. I did not use it.

Q. You referred to a Holden press as having seen it in 1910? A. Yes.

Q. You did not use it yourself? A. No.

Q. Where did you see it operated?

A. I think it was at Newark, New Jersey.

Q. Can you fix the date when you were there?

A. No.

Q. How many times did you see that press in operation? A. Just once.

Q. For how long a period?

A. One day. I was there one day and saw it operate.

Q. Did you ever see a duplicate of that press operated anywhere else? A. No. [931]



(Testimony of Frank S. Hadfield)

Q. Do you know how many of those Holden presses were ever employed? A. No.

Q. Did you learn at the time?

The Court: I did not get the answer to that question.

A. "No."

The Court: No.

Q. By Mr. L. S. Lyon: Did you learn at the time that it was called a Holden press?

A. I might explain that the reason I went to look at this press was that Mr.—

Q. I am not interested in that. Did you learn at that time?

A. I am trying to tell you how I knew it was Holden. You asked me.

Q. The reason that you went to look at it is not what I am interested in. I want to know if at that time you learned that it was called a Holden press? A. Yes.

Q. How?

A. Because Mr. Holden owned it and operated it.

Q. Were you acquainted with Mr. Holden?

A. I met him through his nephew.

Q. Is that the only time you ever saw him?

A. Yes.

Q. How was the slush ice fed into that press? [932]

A. Through a trough, as near as I can recollect. It picked up the ice and water from the—

Q. And where did the trough enter into the press?

A. I don't know. Into the pressing chamber, of course; but just what point, I don't know.

Q. Was there any provision in that press for the escape of gases?

A. I wouldn't know. There wouldn't be any gases to escape normally, except a little air.

(Testimony of Frank S. Hadfield)

Q. Did you ever know of one of those Holden presses being used for the manufacture of dry ice? A. No.

The Court: Answer audibly so that the reporter can hear.

A. No.

Mr. L. S. Lyon: I think that is all, your Honor. Just one minute. That is all.

Mr. Foster: May I ask a few questions?

The Court: Yes, sir.

### Redirect Examination

Q. By Mr. Foster: Mr. Hadfield, when you saw this Holden press in 1910 was it being used in the commercial production of ice? A. Yes.

Q. And were you asked by Mr. Holden or anyone there to keep the knowledge you acquired of that device secret? A. No. [933]

Q. Was the use of the device open? A. Yes.

Mr. L. S. Lyon: I object to that as calling for a conclusion, not a statement of fact.

The Court: Objection sustained.

Mr. Foster: That is all, your Honor.

The Court: Just a moment.

Q. Where was this Holden press being operated? Was it in an open loft of the factory?

A. No; it was in a small building.

Q. In a small building? A. Yes, sir.

Q. Anyone else there with you besides yourself and Mr. Holden? A. Yes.

Q. How many people?

A. Well, I don't remember exactly. There was three of us in the party that went down to look at this, and there might have been others there. There was four or five.

(Testimony of Frank S. Hadfield)

Q. Were the three of you that went down together all engineers.     A. No.

Q. By Mr. Foster: Why did you go to look at the press, Mr. Hadfield?

A. Well, Mr. Holden's nephew was employed in the same concern that I was in Cincinnati, and through correspondence [934] with Mr. Holden, his uncle, he conceived the idea that we could make a lot of money by installing the Martin method of making ice in the Central West, and we were to be given State rights to a large territory and going to make a fortune; so we went back to investigate the possibilities of this thing.

Q. Was the ice produced by the press transparent?

A. No. It was what we call tombstone or white ice, and therefore at that time was practically unsalable.

Mr. Foster: That is all, your Honor.

#### Recross-Examination

Q. By Mr. L. S. Lyon: I take it you turned the proposition down, Mr. Hadfield?     A. Definitely.

Q. You did not make the fortune or any part of it out of it?     A. No.

Q. Do you know what success Mr. Holden had with his press? Did he interest anybody else, to your knowledge?

A. Not that I know of. I don't believe it was a successful operation.

Mr. L. S. Lyon: That is all.

Q. By the Court: You mean commercially successful?     A. Commercially successful.

Q. It made white ice?

A. It made white ice and there was no market for white [935] ice.

The Court: Any questions?

Mr. Miketta: No further questions. [936]

JAMES W. MARTIN,

called as a witness on behalf of defendants, being first duly sworn, was examined and testified as follows:

The Clerk: Will you state your name, please?

A. James W. Martin.

Direct Examination

Q. By Mr. Miketta: Where do you reside, Mr. Martin?

A. In Tuckahoe, New York.

Q. Where do you have your offices?

A. In New York City.

Q. Will you please state what technical training you have had?

A. I was educated in the high schools at Charlottesville, Virginia, and went to the University of Virginia for three years.

Q. You do not have a degree from the University of Virginia?

A. I do not.

Q. Are you a licensed professional engineer?

A. I am.

Q. In the State of New York?

A. Licensed in the State of New York.

Q. Will you please state whether you are a member of any national technical societies?

Mr. L. S. Lyon: I object to that as immaterial. I don't think these societies require anything except a payment of [937] dues, at least a good many of them.

The Court: It depends upon what kinds they are. Phi Beta Kappa and Sigma Chi require a good deal besides payments of dues. You may answer.

A. I belong to the American Institute of Chemical Engineers, and the American Institute of Chemists, American Society of Refrigerating Engineers, and some others, but they fall in the category of counsel; the others belong to the category that counsel brought out.

(Testimony of James W. Martin)

Q. By Mr. Miketta: Will you please briefly state some of your prior engineering experience?

A. If I may refer to my published record? I was with the DuPont Company for about four or five years when I left college; then went with the Tennessee Copper Company as superintendent of one of their plants.

Mr. L. S. Lyon: Can I see what you are reading, please?

A. Yes. It came out of "Who's Who in Engineering," all except the latter entries.

Mr. L. S. Lyon: Have you got a copy we can use?

A. I am sorry, I did not make one. That is just a copy I made.

The Court: You may use it ahead of the testimony and then let them have it.

The Witness: Yes, sir.

The Court: Is that agreeable?

The Witness: Agreeable; yes, sir. [938]

Q. By Mr. Miketta: Were you in the United States Army?     A. I was during the last war.

Q. In what division?

A. I was in the ordnance department.

Q. The ordnance department. Have you had any experience with high-pressure gases?     A. Yes.

Q. With what concern?

A. The Union Carbide and Carbon Company.

Q. For how many years?

A. Wait just a minute and I will check. For about four years.

Q. And what was your position with them?

A. I was in the research department at Cleveland, and then was in charge of the acetylene research division, which was a division of our research laboratory on gases.

(Testimony of James W. Martin)

During that duty I had some work to do in oxygen plants, which is a higher pressure than the acetylene.

Q. Have you been associated with the Dry Ice Corporation?

A. I was. In 1925 I became associated with the Dry Ice Corporation of America.

Q. And when did you terminate that association?

A. In November 30th, 1928.

Q. What has been your present or most recent work?

A. I was engineering manager for Sanders & Porter in the construction of a chemical warfare arsenal at Pine Bluff, [939] Arkansas, that occupied about a year and a half.

Q. Has that work been completed now?

A. The work has been completed; and as of the present time I am a consulting engineer of the Sanders & Porter's only client. The relation is now consulting engineer and client.

Q. Are you the James W. Martin whose name appears as inventor of United States patent No. 1,659,434?

A. I am.

Q. And when did you first construct and operate a snow tank of the type shown in Exhibit B, patent 1,659,434?

A. Approximately May of 1925.

Q. And where was it operated?

A. At the Maspeth plant of the Liquid Carbonic Company, Maspeth being a section of Long Island City.

Q. For how long a period of time did you operate snow tanks at the Maspeth plant?

A. From May, 1925, until the summer of 1926.

Q. Did you move your operations somewhere else at that time?

A. Yes.



(Testimony of James W. Martin)

Q. And where?

A. We moved the operations from the Maspeth plant to the Long Island City plant of the General Carbonic Company, which was located at Sixth Street and East River in Long Island City. [940]

Q. How long did you conduct your operations there?

A. Until the following summer.

Q. And then where was the production unit moved?

A. The production unit was then moved to Yonkers, in the Syrup Products Company plant. They were manufacturers of alcohol and we obtained the gas from the fermentation of molasses.

Q. I take it that during this entire period from about in the spring of 1925 on you were associated with the Dry Ice Corporation, is that correct?

A. I was, from 1925 to 1928.

Q. Will you please generally describe your snow tank as shown in Exhibit B? [941]

A. It was a cylindrical vessel, double-walled; that is, there was a cylinder within another cylinder, and the liquid carbon dioxide entered the inner cylinder through a nozzle. The carbon dioxide gas left the inner cylinder through a reinforced screen. It flowed in the annular space downward around the inner tank, between the inner and outer cylindrical vessels, and the exit was near the bottom of the outside cylinder. The snow was removed after it had been formed and the liquid carbon dioxide shut off. It was removed through a door which gave access to the inner cylinder.

Q. What did the gas do after being released from the snow tank?

A. The gas went back to the compressor through a heat exchanger, in which it exchanged its heat, if you

(Testimony of James W. Martin)

will, with the incoming liquid carbon dioxide. That heat exchanger had various forms. At the Maspeth plant the liquid line ran within a larger pipe, which was the exit carbon dioxide line, and at the Long Island City plant there was a heat exchanger constructed of copper tubes within a steel outer casing.

Q. Can you state the temperatures, or the temperature ranges, of the liquid carbon dioxide that was fed to your snow tank at Maspeth?

A. They vary considerably. I would say they varied from 40 degrees above zero—well, sometimes they were [942] below freezing, because they were frosted. There was no thermometer put on the line, so I can't give the definite temperatures.

Q. What maximum pressures did you obtain within the inner cylinder of the snow tank, Mr. Martin?

A. Again, there was no gauge. It would accumulate; pressures could be observed. Judging by the way the gas escaped from the doors when there was a leak in the gasket around the doors, or when you were first removing the door, I would judge that the pressures were in excess of 50, and not in excess of 100 pounds.

Q. Did you have any safety valves or pop valves on this outer tank or outer cylinder of the snow tank?

A. Yes, there were safety valves at 15 or 20 pounds in the outer cylinder in some of the installations.

Q. Did these pop valves or safety valves operate?

A. Not at all times. At times they froze up. They were not to be trusted.

Q. How much and where would you collect the solidified carbon dioxide that was fed into the snow tanks?

A. The snow was collected within the inner cylinder. After opening the door it was removed from the inner chamber and put into molds and tamped. A plate was put

(Testimony of James W. Martin)

over the snow within these molds, and these were placed on a hydraulic press and the snow was pressed into what is known as dry ice. [943]

Q. Was the equipment which you have described, the snow tank, the first equipment which you used in making solidified carbon dioxide?

A. No, the first used in making solid carbon dioxide was a tank set over a press. There was direct contact between the chamber and the pressing chamber.

Q. Have you any of the drawings, or have you made drawings showing the construction of that press?

A. I have, yes. I made it quite recently.

Q. Will you produce it, please?

A. I have this. I have made notes on it to refresh my memory as to dates and times.

Mr. L. S. Lyon: If your Honor please, I don't think the witness can make a memorandum 20 years after an event, and use that memorandum to refresh his recollection.

Mr. Foster: You misunderstood him.

The Court: He has not been asked to. When he is asked, it is time to object. All he has been asked for is a drawing that he has.

Mr. L. S. Lyon: Is this drawing being offered? If so, I would like to make an objection.

The Court: It hasn't been offered. It has not even been marked for identification.

Mr. Miketta: I would like to have that marked for identification at this time, your Honor.

The Court: It may be marked. [944]

The Clerk: Defendants' Exhibit L.

(Testimony of James W. Martin)

The Court: You may proceed.

\* \* \* \* \*

Q. Will you please state what the apparatus consisted of?

A. The apparatus consisted of a cylindrical tank—

Mr. L. S. Lyon: I don't believe this witness is entitled to use this drawing to refresh his recollection. He is using it. He has it in front of him. He has testified that this drawing was made from memory, 20 years afterwards.

The Court: That is correct. Just describe it, without reference to this drawing.

Mr. Foster: May the record show that the witness has turned the drawing over?

Mr. L. S. Lyon: Yes.

A. The apparatus consisted of a cylindrical tank set over a hopper, which hopper fed into the compressing [945] chamber of a horizontal press. The liquid carbon dioxide was fed into the tank. Some precipitated toward the bottom of the tank, and into the chamber. [946] The carbon dioxide gas left the tank, and returned to the compressor system. The liquid carbon dioxide pipe was placed in the center of the exit gas pipe in such a way that it was in heat exchange relation.

Q. What was in the press? Was there a plunger therein?

A. Yes, the press consisted of the chamber into which the snow fell, and a plunger or pressing head compressing the snow, as the closure of the press. In order to start

(Testimony of James W. Martin)

the press initially we had a plate clamped onto the end of the press by a C-clamp. In the initial operation we would make a block of ice in the press by using this closure, and then the closure was removed and the block of ice formed the closure of the press. The press was used partly as an extrusion press. That is, some of the ice made was made by the extrusion of ice.

Q. Please explain what you mean by an "extrusion press"?

A. It is a press in which the ice extrudes from the open end of a press chamber, being retarded by friction which, in our case, was imposed by either friction devices set in the side of the press chamber, or by diminishing the dimensions of the press nose.

Q. In other words, you had a tapered outlet on the press at some time?

A. There was a tapered outlet on the press when operating it as an extrusion press.

Q. Ice would come out as a continuous long ribbon or [947] block?

A. Yes, it was slid out on a table, and then had to be sawed, but in one of the phases of it we placed a wedge-shaped block outside, and as the ice extruded, and attempted to climb this incline it was cracked off in approximately the length of brick we wished.

(Whereupon an adjournment was taken until 10:00 o'clock a. m. the following day, Wednesday, May 17, 1944.) [948]



Los Angeles, California, Wednesday, May 17, 1944;  
10:00 A. M.

(Parties present as last noted.)

The Court: Are there any ex parte matters? If not, you may proceed.

Mr. Miketta: Mr. Martin.

JAMES W. MARTIN,

recalled

Direct Examination

resumed.

Mr. Miketta: I would like to have the clerk mark this copy of British patent 263,922, filed October 3, 1925, and entitled "Improved manufacture of carbon dioxide" as defendants' next exhibit for identification.

The Court: It may be so marked.

The Clerk: It is M.

[Note: Defendants' Exhibit M will be found in the Booke of Exhibits at page 1373 and 1554.]

Q. By Mr. Miketta: Mr. Martin, you have stated that about May of 1925 you began to use the snow tanks and that prior to that time you had employed a machine which you described and which is shown on Defendants' Exhibit L for identification, is that correct?

A. Yes.

Q. How do you fix the date upon which a machine of the character shown in Defendants' Exhibit L was placed in operation at the Maspeth plant?

A. It was the first job I worked on after coming with the Pressed Air Corporation, the predecessor corporation to [949] the Dry Ice Corporation. The working drawings were made during the latter part of January and



(Testimony of James W. Martin)

February, and the machines were completed during the month of March. As far as the month of March as being the date at which those machines were completed and put into the development stage, that is rather forcibly borne on my mind by the fact it was about that time that I sent for my wife to come up from Virginia to New York, and it was her first experience in New York and her first experience in an apartment; and one of our friends at Columbia had let us have quite a large apartment up there and my wife was a bit nervous about it, and during the time that she was trying to adjust herself to life under those circumstances, with a young child, I was having to spend the time out in Maspeth, which is quite a considerable distance from where I lived, and I worked Saturdays and Sundays and I had very little time to assist her in her readjustment. It has rather fixed it in my mind just at that period of around March in 1925.

Q. You mentioned the Pressed Air Corporation. Was that the name of the company before it was known as the Dry Ice Corporation of America?     A. Yes.

Q. And that change in name occurred about what time?

A. In the spring of 1925 sometime. I didn't know exactly when it was changed over.

Q. What led you to build the machine shown in Defendants' [950] Exhibit L for identification?

A. When I came with the Pressed Air Corporation on January 16, 1925, I was given a diagrammatic sketch by Pierre E. Haynes, a chemical engineer from up Northern New York State, and this diagrammatic sketch, it was the sketch from which we worked and made up the working drawings for the snow tank and press that has been the subject of this exhibit.

(Testimony of James W. Martin)

Q. Do you have these sketches that you acquired from Mr. Haynes?

A. No. They were left with the Dry Ice Corporation. I expect they are in their files.

Mr. L. S. Lyon: I move to strike the last part.

The Court: That may be stricken.

Q. By Mr. Miketta: Do you have a pretty good recollection of what was shown on that sketch that you acquired from Mr. Haynes?

A. Well, it was not an awful lot shown. It was more diagrammatic than a true sketch, but it showed the tank, the snow tank. The inlet, the carbon dioxide inlet was at the top and came down into an annular space that was connected with the snow tank, on the same axis as the snow tank. The CO<sub>2</sub> gas outlet was in the outside shell of the snow tank. The snow tank was set over the top of a press and the press was shown—as I remember, it was shown just diagrammatically, that it, that it was a press. [951]

Q. Do you think you could make a rough pencil sketch similar to that which you received from Mr. Haynes?

A. It would help me a lot if you would let me do it rather than talk, because I think in sketches rather than in descriptions by words. Yes; I can.

Mr. Miketta: May I approach the witness stand, please?

(Witness diagramming on paper.)

A. I can't remember whether he showed a closure or not to the press. We had to put one on as soon as we started; but that was the type of sketch, merely indicating a plunger in the press, a snow tank, an inlet for the carbon dioxide, and an outlet for the carbon dioxide gas, and this annular inner tank which would permit the separation

(Testimony of James W. Martin)

of the snow, which was to fall down from this hopper, and the gas which went out the gas outlet.

Q. Will you please mark the element you have referred to as the snow tank, on this sketch, and which constitutes the press part?

The Court: Let that be received in evidence as explanatory of this witness' testimony, as defendants' next in order.

The Clerk: N.

[Note: Defendants' Exhibits N will be found in the Book of Exhibits at page 1375.]

The Court: C for identification, which you talked about yesterday, was not introduced in evidence, was it?

The Clerk: No.

Mr. Miketta: No, it has not been introduced in evidence. We would like to come to that later, your Honor. [952.]

The Court: I want L. Is L this patent just handed to me No. 263,922?

Mr. Miketta: Exhibit M.

The Court: Wasn't there a reference to Exhibit L?

Mr. Miketta: Yes, your Honor, Exhibit L is a rough diagram. It was referred to in yesterday's testimony, your Honor. It was a sketch very similar in appearance to this one, as I recall, a photostatic copy.

Mr. L. S. Lyon: That is the sketch marked for identification, which your Honor told me I should reserve my objection to until it was offered.

Mr. Morris: We would be glad to lend your Honor ours, if you would like to have it.

Q. By Mr. Miketta: I show you a copy, Mr. Martin, of the Haynes British patent No. 263,933, Defendants'

(Testimony of James W. Martin)

Exhibit M for identification, and ask you whether you find in that patent a diagram illustrating a combined snow chamber and press?

A. Yes, in the lower righthand corner of the drawing is a diagram which indicates the snow tank, with this inner annular space, and an inlet for the liquid carbon dioxide, and an outlet for the gaseous carbon dioxide from the snow tank. This snow tank was set directly over a hopper leading to the press.

Q. Is there any means shown for operating the press?

A. No, it is just the customary diagram for the press.

Q. The little round wheel, and the connecting rod [953] indicate what?

A. They indicate source of power.

Q. For moving—

A. For moving the pressing head, the upper platen.

Q. Is there any description of that portion of the drawing in the patent itself. and if so, will you read it, please?

A. I am reading from page 6 of patent 263,922, line 80. "From heat exchanger coil 35a the cooled liquid passes to valve 36 and is expanded in a suitable snow tower 37; and a substantial portion or approximately 50% is converted into solid carbon dioxide, which may be allowed to fall into a suitable press 38 and is compressed into blocks or ejected, or both. The unsolidified portion of the liquid passing through valve 36 changes to a gas and passes through the porous walls 39 of vessel 37 to pipe 40 and heat exchanging coil 41." [954]

\* \* \* \* \*

Q. By Mr. Miketta: Do you know, Mr. Martin, whether the Pierre E. Haynes whom you met in 1925,

(Testimony of James W. Martin)

or thereabouts, is the same Pierre E. Haynes who is the patentee of the patent, Exhibit M?

A. No, I couldn't know.

Q. Where did Mr. Haynes reside, the one that you knew?

A. He worked at North Tonawanda, which is not far distant from East Aurora. I knew his office, but I did not know his home address.

Q. That is in New York?

A. In New York State, yes, near Buffalo.

Q. Is the drawing which appears on the Exhibit M, of the snowing and pressing equipment, which you have referred to, sufficiently complete for one skilled in the art to permit them to build a machine?

A. May I inquire which Exhibit M is?

Q. The patent before you. A. Yes. [955]

Mr. L. S. Lyon: I object to that—sufficiently complete to what?

The Court: Will you read the question?

(Question read by the reporter.)

Mr. L. S. Lyon: I object to that upon the ground that it calls for a conclusion that it is for the court to draw.

Mr. Foster: I think this man has shown familiarity with drawings, and diagrammatic drawings, and experience qualifying him to answer the question, your Honor.

The Court: I think maybe it would be better if you eliminate the words "for one skilled in the art," and it maybe would not be objectionable.

Q. By Mr. Miketta: If you were given a drawing, Mr. Martin, of the character shown in the lower right-hand corner of this British patent No. 263,922, would you be able to construct an operating machine therefrom?



(Testimony of James W. Martin)

Mr. L. S. Lyon: I object to that on the ground that it is irrelevant what this witness could do in 1944.

The Court: Yes, I think so. Objection sustained.

Q. By Mr. Miketta: Mr. Martin, is the drawing of British patent No. 263,922—by that I specifically refer to the lower righthand portion which you have described—sufficient to permit an engineer to build a machine therefrom?

Mr. L. S. Lyon: Same objection.

Mr. Foster: I think that the witness is qualified to answer, your Honor. He is an engineer. [956]

The Court: Yes, I think he is qualified to answer, but isn't the timing wrong? I, of course, don't know what has happened between the time of the publication of this drawing and the present.

Mr. Miketta: I will modify the question to refer as of 1925.

Mr. L. S. Lyon: Objected to upon the ground that that is a matter for the court, and not a proper conclusion for the witness.

The Court: Objection overruled.

A. That is about the same kind of diagram that Haynes gave me, and we constructed a press from it.

Mr. L. S. Lyon: I move to strike the answer as not responsive.

The Court: Yes, it may be stricken as not responsive. Now just read that question, Mr. Reporter.

(Question read by the reporter as follows: "Mr. Martin, is the drawing of British patent No. 263,922—by that I specifically refer to the lower righthand portion which you have described—sufficient to permit an engineer to build a machine therefrom, as of 1925?")

A. The answer is yes.

(Testimony of James W. Martin)

The Court: Change that question to an ordinary mechanic, and what is your answer, instead of an engineer?

A. If it is a good mechanic, the answer is yes.

Q. By Mr. Miketta: Is it customary, Mr. Martin, to work [957] from diagrammatic sketches before detailed pattern drawings are made?

Mr. L. S. Lyon: That is objected to as irrelevant and immaterial; no time, place or condition fixed.

The Court: I think so. Then I think it is a matter of common knowledge that people don't start at the top; they start at the bottom. They may have a dozen informal sketches before they do anything. It is like making a rough draft of a legal document. There are a few brilliant chaps that dictate it the first time, but I never was one of them.

Q. By Mr. Miketta: Mr. Martin, who actually built that machine for you? A. Eppenbach Incorporated.

Q. Did they build it from instructions which you gave them?

A. Some drawings, some sketches and some instructions.

Q. Some oral instructions?

A. Oral instructions; yes, sir.

Q. Do you recall how thick the walls of the press chamber were?

A. Yes. They were about inch steel castings, with flanges with two-inch faces.

Q. Would the construction and walls of that thickness be capable of withstanding considerable internal pressure?

A. It was so intended.

Q. How did you start operating the machine which appears [958] on Defendants' Exhibit L?

(Testimony of James W. Martin)

May I hand the witness a copy of that exhibit? I think the exhibit is before your Honor now.

Mr. L. S. Lyon: Exhibit L has not been received in evidence.

\* \* \* \* \*

Q. By Mr. Miketta: Approximately when did you make that sketch, Defendants' Exhibit L?

A. May 12, 1944.

Mr. L. S. Lyon: I believe the witness may have mis-[959] understood the question. I would like to ask the witness a question, if I may.

The Court: You may.

Q. By Mr. L. S. Lyon: Is this the original sketch, Exhibit L?

A. Oh, no no. Then I was confused, if you meant that.

Mr. L. S. Lyon: I would like to have the witness answer the question.

Q. By Mr. Miketta: This sketch was not made in 1925? This is a sketch which you just made recently?

A. Yes.

Q. And you made that sketch from your recollection, is that correct?

A. Yes; and to aid my recollection.

Mr. L. S. Lyon: I would like to know when "recently" was. I think we are entitled to know when this sketch was actually made.

Mr. Foster: He said May 12, 1944.

Mr. Miketta: May 12.

The Court: He said May 12, 1944.

(Testimony of James W. Martin)

Mr. L. S. Lyon: I do not believe that the sketch can be used to refresh his recollection. It is just a picture of his recollection.

The Court: It cannot be used to refresh his recollection. It may be admitted in evidence for the purpose of illustrating the testimony of the witness, and for no other purpose. [960]

Mr. Miketta: That is correct, your Honor. I offer it for that purpose.

The Court: It may be received as Defendants' next exhibit into evidence for that purpose only.

Q. By Mr. Miketta: The machine which you have described and which is shown on Defendants' Exhibit L was actually placed in operation, is that correct?

A. Yes, sir.

Q. You have testified, I believe, that that was about March of 1925?

A. Yes; the latter part of March, 1925, to the best of my recollection.

Q. By the Court: Where? Refresh my memory.

A. In Maspeth, Long Island, which is a part of Long Island City.

The Court: I know you have testified to that.

Q. By Mr. Miketta: You were leasing some space there from Liquid Carbonic, is that correct?

A. Yes. The arrangement was that we purchase the liquid carbon dioxide from Liquid Carbonic Corporation and in return for this purchasing of liquid carbon dioxide they permitted us to use the space within their building. There was no lease. I am trying to bring out there was no lease or anything of that kind involved.

(Testimony of James W. Martin)

Q. What was the size for the cross-sectional dimension of the pressing chamber, if you recall? [961]

A. 3-1/2 x 3-1/2 inches.

Q. And how did you initiate or start the operation of the machine which you described and which is shown on Defendants' Exhibit L?

A. We put this plate or plug over the end of the compression chamber and held it in place with a C clamp.

Q. Then what happened?

A. Then we would snow into the tank; snow would fall down through this hopper into the path of the piston. When we had a sufficient charge in there, which we found out by experience and timing, we would start the press up and compress it.

Q. Against that head or—

A. Against that C clamp; yes.

Q. Will you please indicate on Exhibit L that part which you referred to as the C clamp?

A. Shall I indicate it in red pencil, or just indicate it?

Mr. Miketta: Could we have the witness mark it, please?

(Witness marking in red pencil.)

Mr. Foster: May I approach the witness, your Honor?

The Court: Yes.

Q. By Mr. Miketta: And after a block had formed against that C clamp or head which you have indicated, was that C clamp removed?

A. In one of the types of operation it was so removed, the block acting as the closure, the block of ice acted as a [962] closure.

The Court: Read that question, please.



(Testimony of James W. Martin)

(Question and answer read by the reporter.)

The Court: What I was getting at actually was "one type of operation." What do you mean by that?

A. We operated the press, sir, in two ways. One way was as an extrusion press.

The Court: That is an awful big word.

A. Well, extrusion press means that you will constrict this opening. We put a nose piece on that was tapered. Now, if you restrict that opening in that way, then as this operates and as you snow in, this will add increments of ice onto the back end of it and squeeze the front end out of the press.

Q. By Mr. Miketta: Could you indicate the position of the restriction to which you have just referred by dotted lines on Exhibit L?

A. It would then have to be superimposed on top of this clamp. If you wish, I will extend it.

Q. Would you indicate it in dashed lines or dotted lines?     A. Yes (marking on diagram).

The Court: A little heavier.

Q. By Mr. Miketta: Will you please apply the words "nose piece" to what you have just drawn?

A. (Witness marking).

Q. So that an extrusion press apparatus performed the same way that a tube of toothpaste does; in other words, it [963] extrudes a continuous ribbon or bar of material?     A. Yes.

Q. Now, did in both types of the operation to which you have referred—let me modify that question. In both types of operation to which you have referred did the piston or plunger eject the block from the pressing chamber or the ribbon?     A. Yes.

(Testimony of James W. Martin)

Q. And when you were employing this extrusion method how did you separate the continuous bar of solidified carbon dioxide into blocks?

A. It was extruded out on a table. One method was to have a man with a saw and manually saw it into blocks as it came out. We tried to get 8-inch blocks, 8-inches in length. The other method was to put a slightly inclined wedge-shaped piece of metal on the table and in front of the mouthpiece so that the ice, as it extruded, was forced to go up the incline and it would crack into blocks of approximately 8 inches in length.

Q. And all of these operations were carried out at the Maspeth plant?

A. At the Maspeth plant of the Liquid Carbonic Company.

Q. And before you installed any snow tanks there, is that correct?

A. It was before we installed the snow tanks, and the operation continued after we had first installed the snow [964] tanks. It was an over-lapping.

Q. Without referring to any of the previous drawings or exhibits, will you state what changes or modifications were made in the equipment which you state was first built and which was shown on Defendants' Exhibit L?

A. A first change was to take the snow tank off the press down to the hopper. This was done because the snow tended to stick to the sides of the snow tank. It seemed to have an electrical charge on it that makes it cling to the sides of the snow tank. So we took that off and we put the carbon dioxide nozzle down at the base of this cone—conial structure that we had on top of the press, placing a flange over the top of the cone, over the

(Testimony of James W. Martin)

large end of the cone, and attaching the carbon dioxide outlet to the center of this flange. The next—

Q. Pardon me. Could you sketch, make a rough pencil sketch of the apparatus after that change was made which you have just described?

A. (Witness diagramming on paper).

Mr. Miketta: May I have the court's permission to approach the witness?

The Court: Yes.

Mr. Foster: May I also, your Honor?

A. That was the change that I have just described, the diagram marked—I will mark it "1".

Q. By Mr. Miketta: Did you make any changes in the actual [965] tion of the pressing plunger in the press itself, or was it the same as you had before?

A. No; the press was the same.

Q. What additional changes—

Pardon me, may I have that introduced into evidence, your Honor?

The Court: It may be received as defendants' next in order only for the purpose of illustrating the testimony of this witness.

The Clerk: O.

Q. By Mr. Miketta: Did you make any further or additional modifications or changes in that apparatus?

A. Yes. The next step was to take off the conical hopper and bring the outlet pipe down to a spool piece which was an adapter between the press chamber and a 6-inch pipe, 6-inch round at one end and oblong slot at the other end 3-1/2 x 8 inches long which fitted over the press chamber.

(Testimony of James W. Martin)

Q. What was the function of that 6-inch pipe to which you referred?

A. That was to carry the carbon dioxide back to the compressor. A screen was then placed between this adapter and the 6-inch outlet pipe and liquid carbon dioxide was introduced in the lower part of this adapter.

Q. What was the purpose of the screen, Mr. Martin?

A. Was to force the snow to go downward into the press rather than back up through the gas outlet. [966]

Q. Could you make a pencil sketch of this last described modification?

(Witness diagramming on another piece of paper.)

Mr. Foster: May I see the sketch, your Honor?

A. That is a diagrammatic sketch of the next step. There was still a subsequent step to this before the machine was smooth-running as it later became.

The Court: Mark that "2" and put the next one down here for "3," and I won't have so many exhibits.

A. Yes, sir. The next step involved the replacement of the horizontal screen with a wedge-shaped screen designed to resist pressure. This screen, as shown in Exhibit 2 or diagram 2, tended to burst from the snow pressure from within.

Q. By Mr. Miketta: What was the screen made of?

A. The first screen was made of wire mesh with a cloth on the pressure side. (Witness further diagramming on same piece of paper.) At this time we put the carbon dioxide inlet in the side of the chamber of the press.

Mr. Morris: May I see that also, if your Honor please?

(Testimony of James W. Martin)

The Court: Surely. Any of you may come up here if you want to.

Q. Will you mark that inlet line?

A. In the other view of the screen, the screen was a triangular shape. This screen, if you looked at it from this angle, would be shaped so fashioned.

Q. By Mr. Miketta: In other words, it was almost like a [967] wedge?

A. It was wedge-shaped; pyramidal-shaped, and this screen consisted, in final form, of a punched plate, in order to give strength to the wire mesh screen. I think it was a bronze screen. That was on the pressure side of the punched steel backing.

Q. Will you indicate the block outlet on this last diagram? A. I will call it "dry ice outlet."

Q. Will you apply the No. 3 to that figure?

A. That has been done.

Mr. Miketta: I would like to introduce that in evidence for the purpose of illustration.

The Court: It will be received for that purpose only, for the purpose of explaining the testimony of this witness, as defendants' next in order.

The Clerk: P.

Q. By Mr. Miketta: How was the pressing plunger driven in all these modifications?

A. It was motor-driven, from a motor to a large pulley, so as to gain power.

The Court: There was no change in that phase of it, was there? A. No, sir.



(Testimony of James W. Martin)

Q. By Mr. Miketta: When was this last modification which you have indicated as Fig. 3 of Exhibit P completed, to the [968] best of your recollection?

A. The first time we put a pyramid in there, that is, a pyramidal-shaped screen in there was, I think, the last of April, or the first of May. The last one we put in was around the middle of June; so it was over that period that I know we were using it.

The Court: In what year? A. 1925.

The Court: What about the change or modification No. 2?

A. That was the modification that I was describing, sir.

Q. 2 and 3 at the same time, approximately?

A. No; I beg your pardon. Diagram 2, immediately preceded the scheme as shown in diagram 3. The first would burst the screen, and I immediately changed the screen.

The Court: Change 1?

A. Change 1 occurred early in April.

The Court: Of the same year?

A. Of the same year, 1925.

Q. By Mr. Miketta: As soon as you put in this pyramidal screen you moved the liquid injection inlet into the body of the press?

A. Into the press chamber, in front of the piston.

Q. Why did you move it down there?

A. We wanted to form ice down in the press chamber. If we had left it up in the adapter press it would have impinged it against the screen, and would have tended to freeze the [969] screen up so the gas wouldn't go up.

(Testimony of James W. Martin)

Q. You, in effect, were almost forced to move it down?

A. We were forced to move it down, yes.

Q. Was this last modification actually constructed and operated before you put snow tanks in at the Maspeth plant?

A. The first of it was in operation before we put the snow tanks in. To the best of my recollection it was around the first of June that we started to put in the first snow tank.

Q. Mr. Martin, referring back to this period before June of 1925, was there a ready market for carbon dioxide in solid form?

A. No, it was the first time that most people had seen dry ice, when this first dry ice in this little press was sold. That was the first time it had ever got into commercial use, that I know of, as ice.

Q. Did you have any problems, so far as distribution and packaging, and the like?

A. We had many problems. One problem was that people would handle the ice and freeze their hands, and thought it was burning them. The first problem was to convince people that it was not a chemical to be feared. There was no market for it, because it had never, at least in this country, become an article of commerce before, so it was a plaything. We had to teach the people to use it.

The Court: For what? [970]

A. Use it for refrigerator purposes.

The Court: At that time?

A. At that time, yes, in the spring of 1925.

(Testimony of James W. Martin)

Q. By Mr. Miketta: You spoke of blocks measuring, I think you said  $3\text{-}1/2 \times 3\text{-}1/2 \times 8$  inches long. How were those blocks used?

A. They were used to put into ice cream cabinets that we were designing and building at the same time. These ice cream cabinets were adapted for ice of this particular sized block, in a bunker which ran the length of the ice cream cabinet, back of the ice cream cans on top of the cabinet. The cans were built to fit this size block. Other ice was used in Eskimo Pie jars; a vacuum jar, in which a small section of these  $3\text{-}1/2 \times 3\text{-}1/2$  blocks was placed in the top of the Eskimo Pie jar, and the ice was wrapped in paper, and it served to keep the Eskimo Pie at a temperature below freezing. Those were the first uses.

Q. Did you modify the size of the blocks as business developed?

A. Yes, along in the late spring and early summer the first big order came from the Breyer Ice Cream Company, of Philadelphia. We had to ship ice down to Philadelphia, and then ship the ice cream from Philadelphia through to New York in what was known then as a hardening box, a big insulated box. These boxes had a 7-foot cube inside, and just fitted on the truck. These small blocks were not well adapted for [971] that kind of work. It was then we started to seriously consider the snow tank in larger blocks.

Q. What year are you referring to?

A. That was about June, 1925.

Q. Did you make any round cylinders or discs of dry ice also?

A. Yes, just after this use of dry ice by the Breyer Ice Cream Company we were so fortunate as to get the

(Testimony of James W. Martin)

business of the Schrafts Stores, chain ice cream and confectionary stores, in New York, and they, through the instance of George Kusack, who was salesman of the Dry Ice Corporation in those days, they started to use a small hand carton to sell the product. There was an inner carton, and an outer carton, and between the two cartons was a little disc filled with ice, about 3 inches in diameter and 7 inches high, and they punched a hole in the outside carton so it wouldn't blow up. That constituted the first major use of dry ice. [972]

The Court: You mean that you punched a hole—

A. Yes, punched a hole in the carton.

Q. By Mr. Miketta: In what machine did you make these three-inch discs?

A. We had to borrow an old toggle press, and we got a section of three-inch pipe, and cut them up to about six or eight inches in length, I believe it was; maybe a little longer than that; and packed the snow in these sections of pipe, and put them in the toggle press, and eventually arrived at dry ice by pressure in these molds.

Q. Did you already have your snow tanks in at that time?

A. We had to put them in in quite a hurry at that time, because Schrafts was also wanting these little discs of dry ice, and they had to carry the ice cream from the factory to the stores, and they demanded larger blocks, and on top of that they wanted them for display purposes. That attracted a large crowd outside the window; they put the large blocks in the window, and then let it stay there and melt. One of the blocks would last about 30 hours, just sitting in the window. It was a good advertising scheme.

(Testimony of James W. Martin)

Q. Before you started using snow tanks, making three-inch discs, to which you have referred, who was present at the Maspeth plant working with you on those?

A. Walter L. Hood was production manager, W. H. [973] Fitzpatrick was engineer, and there was a man named Underwood, the draftsman, and Mr. Sherwood who was engineer. Those four men I remember.

Q. All of those men saw the machine which you have referred to as illustrated in Exhibits O and P?

A. Yes.

Mr. L. S. Lyon: I think that is too general, your Honor, and calls for a conclusion.

The Court: Yes, I think it is a little general.

Q. By Mr. Miketta: Were those men present at the time that the machine shown in Exhibits O and P was in operation?

Mr. L. S. Lyon: I object to that as too general. I don't think we ought to be charged with testimony 19 or 20 years after the event of such a general nature as this.

The Court: I am inclined to agree with you. I think it is important to particularize. I think they are entitled to specific information as to it, even though it takes a little time.

Q. By Mr. Miketta: Mr. Martin, did any of the gentlemen to whom you have referred have any duties in connection with the machine shown on Exhibit P?

A. They did.

Q. Will you state what duties, for example, Mr. Hood performed in connection with the machine illustrated in Exhibit P? [974]

A. He was in charge of production. He supervised the operation of the machine.



(Testimony of James W. Martin)

Q. During what period of time was he so engaged?

A. Hood came with the Dry Ice Corporation—

Mr. L. S. Lyon: I object to that as not responsive to the question.

The Court: Yes. During what time was he such engineer? Give us the dates.

A. April. Do you limit it to what he was doing?

Q. By the Court: When was he in charge of the operations indicated by P?

A. April through June, 1925.

Q. What year was it that Schraffts put the blocks of dry ice in the windows in New York?

A. In the summer of 1925.

The Court: It is strange; I was curious, and I went down with my brother, who is an engineer, and took a look at it, as a matter of interest. I remember it very well. And he told me about what it was, so far as he knew. I think there was an article on it in one of the New York papers, Sunday edition.

Mr. L. S. Lyon: That was the ice itself?

The Court: A block of ice. I can't remember the year, but it was right along in there; I know that.

Q. By Mr. Miketta: You referred to a toggle press that had been used by Pressed Air, and which was in turn [975] used in making three-inch discs. Do you know what Pressed Air was employing the toggle press for?

A. Yes. Pressed Air was in the business of making accessories for the automobile trade. They made little automobile jacks, that were motivated by the pressure within a small tube of carbon dioxide. They also used the same tire tube, as it was called, to inflate tires on the road; something to carry with you, to keep you from

(Testimony of James W. Martin)

having to pump air into the tires manually. They used this press to press some of the parts that went into this assembly.

Q. Was that press employed by you in making these three-inch cylinders, before you made ten-inch blocks?

Mr. L. S. Lyon: I haven't heard the witness testify to making ten-inch blocks, your Honor.

The Court: I thought he said later, at the instance of the ice cream people, they wanted larger blocks to take care of the trucking of ice cream, and they made ten-inch blocks.

A. Yes, they made ten-inch blocks. It was those blocks you saw in the window.

Q. By Mr. Miketta: While we are on that subject, Mr. Martin, how did you make your ten-inch block?

A. The ten-inch block was made on the snow tank, as described yesterday, when we were discussing the Martin patent. Snow was dug out of these snow tanks, the chunks [976] of snow broken up with tamps, and a loose-fitting plate was placed over the snow in these molds and the molds pressed on a hydraulic press, and compressed about four inches down to approximately ten-inch cubes.

The Court: There were three separate operations: The snow chamber, the tamping operation, and the press?

A. Yes, sir.

Q. By Mr. Miketta: Where did you get the hydraulic press?

A. It was a second-hand Watson-Stillman press. First we operated it with a hand pump, to get our hydraulic pressure.

(Testimony of James W. Martin)

Q. Incidentally, how much did you pay, or what was the cost of the snow press which is shown on Defendants' Exhibit L, which was the first form of the combined snow tank and press?

Mr. L. S. Lyon: I object to that upon the ground that no proper foundation has been laid. I don't know whether this witness paid for it; I don't know whether he kept the records, or how he would know 19 years later.

Q. By Mr. Miketta: If you know.

The Court: Will you read the question?

(Question read by the reporter.)

Mr. Miketta: Let me rephrase it, your Honor: Do you know, Mr. Martin, what was paid for the press built for you by Eppenbach, and by that I refer to the press shown [977] on Defendants' Exhibit L, which is the first form?

A. Approximately \$2700.

Mr. L. S. Lyon: I object, unless he answers—

The Court: Answer yes or no.                    A. Yes.

Mr. L. S. Lyon: I would like to know how he knows.

The Court: You may examine him.

Q. By Mr. L. S. Lyon: Did you make the payment yourself?

A. I took the check over personally, to the best of my memory.

Q. Do you know whether you did or not?

A. That is the best of my memory and belief. That is all I can give now.

Q. Do you remember the amount of that check, of your own independent recollection, 19 years later?

A. I remember that it was between two thousand—

(Testimony of James W. Martin)

Q. Just answer the question.

A. May I have the question, please?

(Question read by the reporter.)

A. Of my own independent recollection I remember it, yes.

Q. I will ask the witness to answer the question yes or no, your Honor. He knows whether he remembers or not.

The Court: He may answer it, and then explain his [978] answer. A. Yes, I remember.

Q. By Mr. L. S. Lyon: How much was the check?

A. Approximately \$2700.

Q. What bank was it drawn on?

A. There you have got me. I don't know.

Q. You remember definitely walking over and handing that check to somebody in this other concern?

A. To the best of my ability, I am trying to remember back 18 years; yes, to the best of my memory.

Q. To whom was the check payable? A. Eppembach, Incorporated. I build that up from the fact that we got the press from Eppembach, Incorporated, and it was logical that it was.

Q. Do you remember who it was payable to?

A. No.

Q. Who did you hand it to?

A. One of two men, if that is permissible.

Q. Are you just trying to reason this out, or do you actually remember?

A. I would have to analyze that. I handed the check to the man who was in charge at the time. There were two brothers. Which of the brothers, I don't know.

Mr. L. S. Lyon: I think that is sufficient, your Honor.

(Testimony of James W. Martin)

Q. By Mr. Miketta: I show you Plaintiffs' Exhibit 5, [979] and ask whether you recognize the equipment there shown? A. Yes, I do.

Q. Will you please state what the mechanism on the left-hand side of the photograph is?

A. That is the toggle press we were just talking about.

Q. Do you see any other equipment there that you recognize?

A. Yes, the Watson-Stillman press, over against the wall in the right-hand corner. No pump is shown, because I think at that time we were using a little hand pump. I recognize the snow tanks, with their characteristic doors and safety valves on the top. Down under the toggle press you will notice some round cylinders, which would indicate that the picture was taken just after we had been making these little cylindrical blocks for Schraffts store—carry-out packages.

Q. That picture was taken at Maspeth?

A. The surroundings would certainly lead you to believe that, and the fact that these round cylinders were in the place would lead me to believe that was at Maspeth, because that was where we made these up for the Schraffts stores.

Q. How do you fix the date, Mr. Martin, on which you first started to make ten-inch blocks, and these three-inch discs? Have you any incident in mind, or can you definitely fix the period when you first started to make snow in snow [980] tanks, and three-inch discs and ten-inch tubes?

A. It was prior to July 4th, because around the 4th of July you have a big surge of business in the ice cream and confectionery stores.



(Testimony of James W. Martin)

Q. What year was that?

A. 1925. It was in anticipation of this business. The business kind of creeps uphill until July 4th. We saw that we had to make ice faster than we could make it on two snow presses we had out there, in action.

Q. Did you have more than one snow press prior to that time?

A. Yes, we had three snow presses ordered and delivered eventually, but one of them was in operation; the other was just sitting outside of the house, and I think the third one was inside the house, but it had not been hooked up until we needed it at last.

Q. Referring again to your snow tanks and the three-inch discs and blocks, how many days or months before this 4th of July of 1925, did you actually have the snow tanks put in operation?

A. I would say it was about a month. That's the best I can remember; approximately a month; maybe it was six weeks, but in that neighborhood.

Q. Were you already supplying the Schraffts stores with the discs immediately prior to the 4th of July?

A. We were. [981]

Q. Of 1925? A. Of 1925, yes.

Q. I think you mentioned some specific use of these ten-inch blocks. What was that use?

A. The first ten-inch blocks were made to supplement the small three and a half by eight-inch blocks. When we got the order from the Breyer Ice Cream Company to ship down to Philadelphia, we shipped a lot of little small blocks, but they used so many of them with a large order—between 2000 and 3000 pounds, and took such a lot of them, it was at that time we started to make the 10 by 10.

(Short recess.) [982]

(Testimony of James W. Martin)

Q. You have mentioned some customers and uses for this 3-1/2 x 3-1/2 blocks, Mr. Martin, and I think you specifically referred to their use in ice cream cabinets. Can you state who else purchased or who else used or how these blocks were used in the spring of 1925?

A. There were several of these confectioners stores. I think one of the first was Boulevard Pharmacy up in Corona.

Q. Was that in New York?

A. That was in Long Island City, in Long Island, anyhow. Another one, that gained very much notoriety, was a fish counter up at the Haufbrau House, up on upper Broadway. These blocks were used to keep the fish cool, lobsters cool in the Haufbrau House, and the old Haufbrau House was quite famous and so many people saw it in that use.

The Eskimo Pie, there was quite a number of deliveries to Eskimo Pie venders. About that time the Eskimo Pie started to—I think it was in the summer of 1925—started, to have these little boxes that carry Eskimo Pies for vending in the ball grounds; and they used this size of block ice, this 3-1/2 x 3-1/2. All of those uses used the 3-1/2 x 3-1/2-inch block; and those were uses, with the exception of this last one with the Eskimo Pie sale at the ball parks, was prior to this 4th of July peak in which we went over to the large blocks, 4th of July, 1925.

Q. The blocks which you made on the presses or on the equipment illustrated on Defendants' Exhibits L, P, and O were [983] all merchantable, were they not?

A. Yes; they all were. We sold all the product we made on it.

(Testimony of James W. Martin)

Q. What did the ice look like or the blocks of ice?

A. Sometimes it was white, which we know of now as snow ice; sometimes it was translucent, which we know now it is as triple point ice. The customers in those days did not like the triple point ice much because it was kind of gray, that is, when the frost came on it, the white frost came on it, why, you saw the white frost against a little darker background which looked grayish, and for some reason or other they didn't like that. I suppose they had displayed it so much that—

Mr. L. S. Lyon: I don't think this witness should depart from the questions and bring in what other people thought, and no foundation laid.

The Court: Yes; that may be stricken. Try to answer the express question and then stop, and then we will get along faster.

The Witness: Yes, sir.

The Court: Tell me this: You say sometimes it was a white, opaque ice and sometimes it was the darker, translucent ice. You don't mean that one block would be one and one would be another, but it came in series, is that it?

A. Yes, sir. If you left the liquid on too long, left the liquid valve open for a longer period, you would very [984] frequently get the translucent blocks; but if you just cracked the valve, that is, released it slightly into the path of the piston, why, you would get the snow ice under those conditions. It could be controlled to some extent by the manual operation of that valve.

(Testimony of James W. Martin)

Q. By Mr. Miketta: At that time—and I refer to the spring of 1925—did you know the physical properties of liquid carbon dioxide and the triple point thereof?

A. Yes. Haynes left me a triple point curve to guide me on that.

Q. Where in the Maspeth plant was this press and all of its modifications that you have been referring to, namely, those modifications shown on Exhibits L, P, and O?

A. It was—I can't give whether it was the—I think it was the southeast corner of the building, but I can't be sure of that; but it was on the ground floor of the plant and faced a big double door, which I think gave out to a railroad track and a road. The press was—

Q. Was it in a separate room?

A. Oh, no; it was in the same. It was in the same room with the compressor and the filling stand for the cylinders, and it was a separate room for empty cylinders. It was in a large room.

Q. Was it available to other workmen in the plant?

A. Oh, yes, yes. They had free access in that room.

Q. By the Court: It was in the open loft? [985]

A. It was an open building; yes, sir.

Q. By Mr. Miketta: Did you have any visitors at that plant?

A. Oh, yes; were were cursed with visitors. They came all the time.

Q. And that is during the spring of 1925?

A. Yes, yes. This was new—I beg your pardon. I should not advance anything.

Q. Pardon me. Did you give any instructions to keep visitors out? A. No.

(Testimony of James W. Martin)

Q. Did you know Mr. McLaren at that time?

A. Only by reputation. [986]

\* \* \* \* \*

Q. By Mr. Miketta: When did you move the equipment for producing solidified carbon dioxide to the plant of the General Carbonic at Sixth and East River?

Mr. L. S. Lyon: The same objection, your Honor.

The Court: Objection overruled.

A. We moved to the Sixth Street and East River plant in the last of the summer or in September of 1926.

Q. By Mr. Miketta: And how far was that from your Maspeth plant?

Mr. L. S. Lyon: The same objection as made to the same question when it was previously asked.

The Court: Objection overruled.

A. Approximately three miles.

Q. By Mr. Miketta: Are both those places part of Long Island City?

A. I believe it is; yes. That is my belief.

Q. I think you referred to the price paid for the first press made for you in 1925. Do you remember the price that was paid for the second and third presses to which you have referred?

A. They were a little less. I think that they were in excess of \$2,000, but not much in excess of \$2,000.

Q. How does that price compare with the price or cost of [987] a snow tank?

A. Oh, a snow tank costs—well, the first ones cost around \$400. They got cheaper as we learned better how to make them, or, rather, as the vendors learned better how to make them.



(Testimony of James W. Martin)

Q. Why did you go to a snow tank instead of making or having made for you a large press similar to that shown on Exhibits L, P, and O?

A. Well, one thing was the time element. We were in a big hurry to get this ice, and snow tanks, we could make those in three or four days. We had the hydraulic press, or was able to get it. I have forgotten whether we owned it prior to that or not, a second-handed Watson and Stillman press. The other thing, though, and probably the main thing, was Mr. August Heckscher was putting up the money for this development work and he didn't like to put up money much.

Q. Who was Mr. August Heckscher?

Mr. L. S. Lyon: I object to that statement as incompetent.

The Court: That may be stricken.

Q. By Mr. Miketta: Who is Mr. August Heckscher?

A. Mr. August Heckscher was a philanthropist. I think he had greater fame as a philanthropist than anything else. I have forgotten how he got his money, but he lived in New York.

Mr. L. S. Lyon: I object to this as immaterial.

The Court: Objection sustained. [988]

Q. By Mr. Miketta: What was Mr. August Heckscher's connection with the Pressed Air Corporation or Dry Ice Corporation of America?

A. He was president.

Q. And did you know the cost of a press sufficient to press 10-inch blocks?

A. At that time we knew what it cost us to make this  $3\frac{1}{2} \times 3\frac{1}{2}$ , and we extrapolated about what it would cost for a 10 x 10 press.

(Testimony of James W. Martin)

Q. What was your estimate?

A. We estimated it was going to cost us around \$10,000.

Q. Do you recall the total production of solid carbon dioxide in block form which you manufactured during 1925?

A. Approximately 135 tons.

Q. When you moved your equipment to the plant of General Carbonic Company at Sixth Street and East River who was at such plant?

A. The man in charge of the plant was Mr. McLaren, Malcolm McLaren.

Q. And who were some other officers or officials of General Carbonic at such time?

A. Mr. George Petty, I think, was president or vice-president. He was the man that we had to see to make arrangements—that I saw to make the arrangements for coming over to Sixth Street and East River. Mr. Cole was introduced to me as the engineer, Mr. Harry Cole. [989]

Q. Now, did you move the combined snow-forming and block-pressing machines which you had down at Maspeth over to the plant of General Carbonic?

A. To the best of my recollection—

Mr. L. S. Lyon: I would like to have the witness testify. Answer the question.

Mr. Miketta: I object to the interruption, your Honor. I think the witness was answering the question.

The Court: I think so. Read the question.

(Question read by the reporter.)

A. To the best of my knowledge and belief, we moved everything we had from over at Maspeth but we did not

(Testimony of James W. Martin)

install—I mean we moved it from Maspeth over to Long Island, to the Long Island City plant of the General Carbonic Company, everything we had out at Maspeth.

Mr. L. S. Lyon: I move to strike the answer as not responsive to the question.

The Court: The only thing that may be stricken is “but we did not install it.” That portion was not responsive. The balance may remain.

Q. By Mr. Miketta: Did you install the snow-forming and pressing machines?

The Court: It may be more inclusive than the question, but it covers the question all right.

Mr. L. S. Lyon: He has not answered whether in 1926 he had this equipment. He just says he moved everything they had. [990] He was asked if he moved certain equipment, and I submit that is not an answer, although your Honor has ruled.

The Court: I think he testified he had the equipment. If he has not testified that he had the equipment, I may rule that way. Ask him that question. I may be in error. I thought he had testified to that.

Q. By Mr. Miketta: At the time you moved your equipment to the plant of the General Carbonic, Mr. Martin, did you have that combined snow-forming and pressing equipment which you have illustrated on Exhibits P and O?

A. Now, wait a minute. Exhibits P and O, which are those? I don't wish to be confused.

(Mr. Miketta exhibiting documents to witness.)

A. Yes; we had those.

(Testimony of James W. Martin)

Q. Did you install that equipment at the plant of General Carbonic? A. No.

Q. What did you do with that equipment?

A. It set out in the yard along with a lot of other scrap equipment. The yard was between the building in which we set up the snow presses and the East River.

Q. Was that equipment boxed in or protected from the weather or covered up? A. No; it was open.

Q. It was visible to people around the plant?

A. That's true. [991]

Mr. L. S. Lyon: Object to that as immaterial.

The Court: Overruled.

Q. By Mr. Miketta: Did you continue the production of solidified carbon dioxide and the manufacture of blocks at the plant of the General Carbonic Company?

A. Yes; in the snow tanks.

Q. Yes. A. Yes.

Q. And just to clarify the record again, I believe you stated that that move to the Sixth Street and East River plant occurred about in September of 1926, is that correct?

A. Approximately at that date. We moved—whether it was the equipment, if I may clarify my point here, if it was not the equipment that I have described as that first installed, it was equipment which was purchased and replaced that first installed. In other words, possibly the first snow tanks may have worn out and we replaced them with new—that I can't recall—and equipment similar to that that we first installed was brought over there.

Q. And your operations at the plant of General Carbonic were initiated about September of 1926?

A. Yes; to the best of my memory.

(Testimony of James W. Martin)

Q. While you were conducting your operations at the General Carbonic plant did you discuss the manufacture of solid blocks of carbon dioxide with others?

A. Yes. [992].

Q. Will you please name them?

A. Well, of course, with my associates, but also with the superintendent of the plant, Mr. McLaren.

Q. Why were you discussing that with Mr. McLaren?

Mr. L. S. Lyon: I think that is immaterial, your Honor.

The Court: Objection sustained.

Q. By Mr. Miketta: Will you give the substance of your discussions with Mr. McLaren?

A. He came up and Mr. McLaren objected to the amount of carbon dioxide we were wasting; that when you opened the doors of these snow tanks considerable carbon dioxide gas comes out. When you press the block in these presses, why, there is a big evolution of gas. Mr. McLaren was needing this gas to make a liquid for cylinders and he quite rightfully complained about the amount of gas we were wasting.

Q. About what time were these conversations taking place? A. Well, it was soon after we got there, as soon as he saw how wasteful our process appeared to him.

Q. That would be shortly after September of 1926?

A. It would.

Q. Who else was present at those discussions with Mr. McLaren? A. Mr. Hood.

Mr. L. S. Lyon: If your Honor please, that is too indefinite. I think we are entitled to have the time and the



(Testimony of James W. Martin)

persons present fixed in connection with any particular [993] discussion. A question in this form is too indefinite.

The Court: I think so.

Mr. Miketta: I will rephrase it, your Honor.

Q. At the time of the discussion to which you have just referred with Mr. McLaren was anyone else present?

A. Yes.

Q. Who?

A. Mr. Hood, Mr. Fitzpatrick, Mr. Sherwood.

Q. Who is Mr. Sherwood?

A. Mr. Sherwood was an engineer that was employed at that time by the Dry Ice Corporation.

Q. And where did these discussions take place or this particular discussion with Mr. McLaren take place?

A. It was in the room adjacent to, or, rather, in the room in which these snow presses were, the snow tanks and the press were located at the General Carbonic's plant at Sixth Street and East River.

Q. During your stay at the General Carbonic Company's plant in 1926 did you discuss with Mr. Hood or with Mr. McLaren any other changes or methods of manufacturing solidified carbon dioxide in block form?

A. We discussed both with Mr. McLaren and Mr. Hood the possibilities of doing our pressing and tamping and snow formation all in one housing so as not to waste this gas that we were wasting.

Mr. L. S. Lyon: I move to strike the answer as indefinite [994] and not a proper answer to the question, because it does not reveal who made these suggestions. And I call your Honor's attention, as will appear later,

(Testimony of James W. Martin)

that we may get into some difficulty if this is not straightened out here, that Cole and McLaren had already made their invention in 1926, as has been held by the Patent Office, and prior to September, 1926 in the interference proceedings which will be referred to in this case. And I can't tell whether this witness is attempting to testify that he made these suggestions or Mr. Hood or somebody else.

The Court: Read the question and the answer, please, Mr. Reporter.

(Question and answer read by the reporter.)

Q. By Mr. Miketta: Who advanced that suggestion?

Mr. L. S. Lyon: Wait just a minute. I would like a ruling on that.

Q. By the Court: When did you have any such conversation with Mr. McLaren, more specifically?

A. It would be in the month of September or October, because it was very soon after he first saw this evolution of gas as it came off at this time.

Q. And who were present?

A. Mr. Hood I remember definitely, the others probably. Mr. Hood and Mr. McLaren were present.

Q. Who made any suggestion about incorporating these three processes in one casing? [995]

A. Mr. McLaren complained about the loss of gas. I made the suggestion that we had been doing it as indicated in this press here, in which we did not waste this gas, and that that was what eventually we would be doing again.

Q. You made that statement yourself?

A. I made that statement to Mr. McLaren and to Mr. Hood.

(Testimony of James W. Martin)

Mr. Miketta: I would like to have the clerk mark the certified copy of the file wrapper, contents and drawings, and an application filed by James W. Martin, Jr., on December 6, 1926, under Serial No. 152,754 "For improvement in carbon dioxide ice apparatus process and product" for identification.

The Court: It may be so marked Defendants' next in order.

The Clerk: Exhibit Q.

Mr. Miketta: Incidentally, I think this matter is covered by a stipulation, your Honor, and I think it can be marked as an exhibit in evidence.

Mr. L. S. Lyon: I don't know what stipulation that it can be marked as an exhibit. There is no materiality shown. In connection with the examination of this witness I don't know what this has to do, but if there is any stipulation—

Mr. Miketta: I guess not, your Honor. The stipulation does not.

Q. Do you recall, Mr. Martin, whether you filed an application for patent sometime in December, 1926?

A. Yes.

Q. I show you—may I approach the witness, your Honor?— [996] a Defendants' Exhibit Q for identification and call your attention specifically to page 2 of this photostatic copy, and ask you if you recognize that signature?

A. Yes; that is my signature. At that time I was Junior.

Q. I also call your attention to page 23 of this exhibit.

A. That was my signature.

(Testimony of James W. Martin)

Q. I call your attention also to the drawings forming a part of this certified copy of the application and ask you to state whether you recognize that?

A. Yes; I recognize it.

Q. Will you briefly state what is shown in these drawings?

A. In Fig. 1 there is shown a snow tank, cylindrical, and in a horizontal position, inclined position, nearly horizontal, with an inner and outer shell, means for bringing liquid carbon dioxide into the inner shell.

Q. Where is that indicated?

A. It is indicated at No. 3 in the Figure. A small outlet to the inner shell. The screen is marked 7 in the Figure. An outer shall marked 13 in the Figure.

Q. Is there a gas outlet shown?

A. A gas outlet is shown at 9. Inside of this chamber is a series of breaker arms which were designed for two purposes: Both to break the snow that tended to cling to the sides of the snow chamber and also to discharge the static charge of electricity that was in the snow. The jet or the [997] nozzle, liquid carbon dioxide nozzle was so placed so that the snow formed would be blown toward the far end of the chamber, the breaker arm would be kept stationary except at infrequent intervals.

Q. Where did the snow go?

A. At the far end of the snow tank there is a space in the lower portion of the cylinder for the exit of the snow into another chamber marked 20 which connected directly to the path of the piston in the press.

Q. And you are now referring to Figs. 2 and 3 of this application?

A. I am referring to Figs. 2 and 3 of the application.

(Testimony of James W. Martin)

Q. Where do you see the piston, or by what number is the piston indicated?

A. The piston is indicated by No. 22.

Q. In Fig. 3? A. In Fig. 3.

Q. And at what point would the compressed block be ejected?

A. As described in the press that was first used at Maspeth plant, in order to operate this press you must first have a closure over the end of the press chamber. After you have formed a block of ice, then that ice would, by friction, become the end of the press against which the subsequent snow is to be pressed. That was made to stick, or, rather, to increase that friction, why, there was a little pin shown at [998] 27 to drive in to keep that ice from slipping and going out. Then after that, each press movement was to press another block, as shown in X and X<sup>1</sup>, so that the ice in the exit throat of the press had time to—we said in those days “to season,” but to permit the gas, occluded gas to come out of the ice. It was open to the atmosphere so that it could boil out from the block of ice.

Q. In other words, the outer surface of the exterior block was open to the atmosphere?

A. Open to the atmosphere.

Q. So that gas could escape from the block, is that correct? A. That is right; that is right.

Q. Did you see these drawings which you have just described at the time that you executed this application?

A. Yes.

Q. And you were familiar with the contents of the application at the time you signed it? A. Yes.

Mr. Miketta: I ask that this be introduced into evidence, your Honor.



(Testimony of James W. Martin)

Mr. L. S. Lyon: I object to that on the ground there is no materiality shown for this entire file. Perhaps the oath and the drawings and signatures that the witness has identified. But here is a great, elaborate document here which is not admissible under any theory that has been advanced; [999] and it is a file wrapper that apparently, as your Honor can ascertain, a file wrapper without a patent office action on Mr. Martin's application.

The Court: I do not see its admissibility other than it has been referred to by the witness.

Mr. Foster: I think it is admissible, if the court please. on this ground: Of course, the application as filed and the amendments that were made thereto are evidence of the knowledge of this witness. This witness has been pleaded as having prior knowledge, and certainly the documents which he signed there, the application and so on, are evidence that he had the knowledge as on that date. Furthermore, this file, which is certified by the United States Patent Office as a photostatic copy of the documents on file there, is material, all of it, upon this issue: There is an affirmative pleading that the subject matter of the patent in suit was invented, if it involved any invention, not by Cole and McLaren, but by Mr. Martin and that the plaintiffs or their predecessors in interest suppressed that invention; and in order to determine that the application was abandoned, with a very considerable number of claims allowed by the Patent Office, and in that manner suppressed so that it required, even for the defendants involved in this litigation, to make a considerable showing to the Patent Office to get this copy, it is necessary for the court to have the entire file or the court could not determine its abandonment, and hence we [1000] urge this suppression, unless the court had the complete file, and the plaintiffs would urge that it was

(Testimony of James W. Martin)

not admissible upon that affirmative defense of suppression if the file were not complete.

Mr. L. S. Lyon: I think, your Honor, there ought to be some evidence of suppression before it is allowed to be received on that theory.

The Court: Of course, it is a matter of order of proof. I think, in order to simplify it, we had better let it in, with permission granted to move to strike in the event it is not properly connected up to make it material. At the present time, of course, it is not material and would not be admissible as an exhibit in evidence. It is rather hard to separate one part from another for the purpose of this motion, so we will just take care of it that way temporarily.

Mr. Foster: I believe the court will find also that this file contains evidence of the title being in the predecessors of the plaintiff, so that it is self-sufficient for that purpose. However, there is other evidence along the same line.

Mr. L. S. Lyon: As I understand it, the court is not admitting this document except tentatively now?

The Court: No.

Mr. L. S. Lyon: And it is not necessary for us to make additional objections to it at this time.

The Court: No. You may have a motion to strike—  
[1001]

Mr. L. S. Lyon: If they can make a claim of title by such a document as this, I want to be heard on it.

The Court: Well, you will in time, undoubtedly.  
[1002]

Q. Mr. Martin, you have made this carbon dioxide snow in one vessel or snow tank, and have compressed that snow in a separate press, have you not? A. Yes.

(Testimony of James W. Martin)

Q. And you have also made and compressed carbon dioxide snow in the same chamber, have you not?

A. Yes, that's true.

Q. Is a different effect obtained by solidifying carbon dioxide by expanding liquid CO<sub>2</sub> in a chamber that does not contain a pressing plunger, than the effect obtained by solidifying carbon dioxide by expanding the liquid in a chamber that does contain a pressing plunger, other conditions as to temperature and pressure being equal?

A. Yes.

Mr. L. S. Lyon: I think the question is too general, and should be confined to the particular apparatus that was in the experience of this witness.

The Court: I am rather inclined to think that is a matter of cross examination. I think with the addenda "other conditions being equal" the question is proper. The question is: Does the presence of the press, as a part of the apparatus, opened to the snow chamber, in any way affect the product, within your experience, all other conditions being equal?

Mr. Miketta: I adopt that question.

A. There is no difference. [1003]

Q. Is a different result obtained by compressing carbon dioxide in the same chamber, in which it was formed, than that obtained by forming the solidified carbon dioxide in one chamber and compressing it into another?

Mr. L. S. Lyon: Same objection.

The Court: Same ruling. I think if there is a distinction, you may bring it out on cross examination. I don't see much difference between this question and the other one, but you may answer it.

A. There is no difference.

(An adjournment was taken until 2:00 o'clock p. m. of this same day.) [1004]

AFTERNOON SESSION  
2:00 O'CLOCK.

The Court: You may proceed.

JAMES W. MARTIN,

recalled.

Direct Examination

resumed.

Q. By Mr. Miketta: Mr. Martin, were you aware of the fact that your application, serial No. 152,754, which was filed December 6, 1926, Defendants' Exhibit Q, was involved in an interference or interferences?

A. I was.

Q. Were you asked to testify during the interference proceedings regarding your dates of invention?

Mr. L. S. Lyon: I object to that on the ground it is incompetent, irrelevant, and immaterial.

The Court: Let me hear that question again, please.  
(Question read by the reporter.)

The Court: Objection sustained.

Q. By Mr. Miketta: Did you at any time, Mr. Martin, refuse to testify in connection with any of the matters relating to the combined pressing and snowing machines to which you have referred this morning?

Mr. L. S. Lyon: The same objection, an improper method of proof.

The Court: Objection sustained. [1005]

\* \* \* \* \*

The Court: Answer me this question: What is the date of the original application, indicated by the file wrapper?

(Testimony of James W. Martin)

Mr. Foster: The Martin application was December 6, 1926, as compared with the Cole and McLaren application of May 22, 1928.

The Court: What date did Martin assign his interest in that patent application? [1014]

Mr. Foster: My understanding is he assigned his interest in the patent application when he signed the application, before it was filed.

Mr. Miketta: By an instrument dated December 11, 1926, your Honor.

The Court: What difference does it make as to what Martin did? He did not have any interest in the patent. He did not have to testify. [1015]

\* \* \* \* \*

Mr. Miketta: \* \* \*

Q. Mr. Martin, have you ever testified regarding this same machine which you built in 1925, at any other time?

A. No.

Q. Have you ever been asked to do so by anyone who owned title to your application for patents?

A. No.

Q. I show you a copy of your patent No. 1,659,435, and ask you to compare the drawing of that patent with the drawing forming the apparatus of Exhibit Q.

A. The general outlines of Figure 1 in Exhibit Q, when taken with the general outlines of Figure 2 of the same exhibit, are similar to the general outlines in this patent 1,659,435?

Q. And are you the J. W. Martin whose name appears on Patent 1,659,435? A. I am.

Q. Did this Patent 1,659,435 have any reference to a combined snowing and pressing operation?

A. It did.



(Testimony of James W. Martin)

Q. Will you please call attention to that part of the patent which so states? I call your attention to page 4. [1017]

A. All right. That would save time.

Q. Will you read the pertinent part of that patent? This patent is mentioned in the list of patents, and is part of the booklet.

The Court: I have got it.

Mr. Miketta: It is No. 1,659,435.

A. I start reading on page 4, at line 44:

"The snow chamber is shown as inclined for the purpose of facilitating clearing out of snow at the far end of the chamber, in a bin 24, to which access may be had through the door, 25. [1018]

"The snow chamber may be and preferably is, provided with agitating scrapers for clearing the snow that collects on the inner surface of shell 10, as described in a companion application of even date herewith, and the exit, 25, may be the path of movement of a compressor as shown in said companion application."

Q. I call your attention to patent No. 1,887,692, and ask whether you are the James W. Martin named as inventor in that patent?

A. I am the James W. Martin.

Q. Will you please compare the drawings appearing in patent 1,887,692 with the drawings, Figs. 2 and 3, of Exhibit Q.

A. They are apparently duplicates—they are duplicates; the drawings are duplicates.

Mr. Morris: May I have that answer read? "The drawings are" what?

(Answer read by the reporter.)

(Testimony of James W. Martin)

Q. By Mr. Miketta: Mr. Martin, do you have any recollection as to approximately how many tons of solidified carbon dioxide in block form you actually manufactured and sold at Maspeth prior to July, 1925?

A. To the best of my recollection, it was in the neighborhood of 20 tons.

Q. And what proportion of that was actually made on the combined snow and block-forming machines which you have [1019] referred to and which you illustrated on Exhibits—

The Witness: May I have the previous—

Q. —O and P?

The Witness: To make sure that I have understood your question, may I have the previous question read to me, the question that I answered? May I have that read back to me?

The Court: Yes.

Mr. Miketta: Yes.

The Witness: I may have made a mistake.

(Previous question read by the reporter.)

A. My answer should have been between 20 and 30 tons, made prior to July.

Q. By Mr. Miketta: Now I ask what proportion of that, or approximately how many tons of solidified carbon dioxide in block form was made by you on machines such as those shown on Exhibits O, P, and L?

Mr. L. S. Lyon: I don't think the witness has testified to any plurality of machines during that time.

Mr. Miketta: Well, your Honor, those machines changed in form, as I understand, from L to O, or to P and then to O, eventually, and with the understanding that all those forms were employed in manufacturing blocks, I am simply trying to find out what was the total

(Testimony of James W. Martin)

number of pounds or tons of solid CO<sub>2</sub> that were made on these machines.

The Court: With that understanding, you may answer the question. [1020]

A. Between two-thirds and three-fourths of the total amount that was made prior to July 3rd was made on this type of machine as indicated in these exhibits. May I change that last answer to clarify it, your Honor?

The Court: Yes.

A. It was made on the machines of the type as indicated in these drawings.

Q. By Mr. Miketta: Now, just to summarize your testimony and get our dates straight, as I understand it, it is your recollection—

Mr. L. S. Lyon: Now, if your Honor please—

Q. By Mr. Miketta: —that the machine of Exhibit L was built and operated when?

A. Will you enlighten me as to which is L? I am sorry not to remember.

Q. This is L (indicating exhibit).

The Witness: May I have that question, please?

(Question read by the reporter.)

A. The machine as indicated by Exhibit L was operated from approximately the end of March to some day in the following April, that is, April of 1925.

Q. By the Court: March of '24 to April of '25?

A. No; March of '25 to April of '25.

The Court: Oh, I see; the same year.

A. The same year. It was just a brief—it was a few weeks. [1021]

(Testimony of James W. Martin)

Q. By Mr. Miketta: And what is your independent recollection as to when a machine of the type shown on Exhibit O was actually operated?

A. By Exhibit O you refer to these diagrams of the press without a snow tank?

Q. One of them is marked Exhibit O, Mr. Martin.

A. I am sorry. I am not familiar with it.

Q. This is the exhibit.

A. Oh, I beg your pardon. I see it now. That was a brief period, I believe, in the month of April that this modification of the machine was employed in making ice.

Q. April of 1925? A. April of 1925.

Q. And now referring to machines embodying the modifications shown on Exhibit P, when was that machine actually built and operated?

A. The diagram as indicated as No. 2 was also a brief, transitory period, probably not exceeding a month. When this screen kept bursting we abandoned that modification and went directly to the modification as shown in diagram 3 which had the reinforced pyramidal screen. At that time the liquid CO<sub>2</sub> was injected into the machine down in the press chamber.

Q. And when was that last modification actually put in operation? A. It was in May of 1925. [1022]

Q. So that, independent of the time when you moved out of Maspeth, all these forms of machines had been built and operated during the months of March, April, and May of 1925, is that correct?

A. They had been operated during those months.

Q. And is it your recollection that definitely all of these things took place before July 4th, 1925?

A. I have very definite remembrance of those events.

(Testimony of James W. Martin)

Q. Mr. Martin, do you know what pressures you actually obtained in the machine of Exhibit P, Fig. 3?

A. I have no way of determining the exact pressures, as we did not put a gauge on the machine. I have evidence of the pressure which I think most engineers would back me up in, that, first, the necessity of making a pyramidal screen in order to hold the pressure; second, the fact that the ice produced was clear, translucent ice.

Q. What does not indicate to you?

A. Well, it indicates that it was made from triple point snow; a snow had been formed at around the triple point.

Q. Did you have any difficulty in driving the plunger of that press?

A. Yes. We could not drive it against the pressures of that magnitude and we put in a vent over on the drive side of the machine between the drive and the snow, where that snow tank had been setting, to relieve the pressure. It was just a valve which relieved to atmosphere, permitting us to press [1023] the snow. We could not have pressed the snow; we did not have power enough to press the snow while it contained the liquid.

The Court: Now, let me see if I understand you.

Q. Taking these various modifications of the original apparatus, individually and collectively, the modifications that you made did not affect the pressure that you carried in the snow chamber, did it, up to the time you put a vent in, I mean, as depicted on these drawings?

A. Yes, sir. Before we put this pyramidal screen right above the press chamber there was opportunity for the press to relieve itself through into the line going back, the exit line going back to the compressor.



(Testimony of James W. Martin)

Q. I see. Then, when you put the screen in you plugged it up to such an extent that it could not get through there?     A. Yes, sir.

Q. Then you put on the pyramidal screen to relieve that situation?     A. Yes, sir.

Q. And then you found that the pressure in the chamber of the press was so great that you did not have power enough to operate your press and you had to relieve that by a vent?

A. Yes, sir. When you were injecting liquid at above 60 pounds pressure, the liquid was up against the screen so that it evaporated right in the screen and plugged the screen up. Then we found we had to release it to atmosphere in [1024] order to work the platen of the press, the piston.

Q. By Mr. Miketta: Well, have you indicated a valve on this Exhibit P, Fig. 3?     A. I have not.

Q. For a vent?

A. No; I have not indicated that.

Q. Where was it located, Mr. Martin?

A. It was located at this point, which is to the power end, the drive end of the press, adjacent to the carbon dioxide outlet.

The Court: Indicate that with a red pencil.

A. (Marking on exhibit) This cross indicates a valve set in the line at the position indicated.

Q. What I was getting at was this: Until you put in that vent there was nothing that you did intentionally to control the pressure in that machine, and the way you told what the pressure was came from experience. When it came out with heavy force, you knew you had high pressure?     A. Yes, sir.

(Testimony of James W. Martin)

Q. When you could not operate your press, you knew you had high pressure. When the product came out in translucent form, you knew that it must have gotten to the triple point or above? A. Yes, sir.

Q. You did not have any gauge?

A. It was crude, preliminary operations. [1025]

Q. By Mr. Miketta: Mr. Martin, as these blocks were extruded from the press was there any gas escaping through that opening also?

A. Yes; gas escaped through the delivery end of the press around the blocks.

Q. And that was true in all of these modifications wherein you were using an extrusion type of operation?

A. Yes; it seemed to be the gas that was occluded in the ice itself partially, and partially gas that squeezed between the block and the press itself, press walls.

Q. It is my understanding, Mr. Martin, that you continued the use of these snow tanks throughout your stay at the plant of the General Carbonic Company, is that correct?

A. We used—yes; we continued the use of snow tanks in the General Carbonic plant at Sixth Street and East River.

Q. And you moved away from that plant and went to Yonkers, is that correct? A. Yes; that is correct.

Q. What was the time of that move, approximately?

A. It was in the fall of 1927, the early fall I would say.

Q. Did you ever have anything to do with the Elizabeth, New Jersey, plant of the Dry Ice Corporation?

A. Yes. That was built under my supervision, designed in May, 1927, and built in 1928, to the best of my memory.

(Testimony of James W. Martin)

Q. Was any continuous or combined snow-forming and block-pressing machine built for use in the Elizabeth plant? [1026]      A. Yes. [1027]

\*      \*      \*      \*      \*      \*      \*      \*

Q. By Mr. Micketta: Did you design a machine for use in the Elizabeth plant?      A. I did.

Q. Was such a machine built?

A. Such a machine was built and installation was under way when I left the company.

Q. You did not see the machine after it was completed?

A. I did not see the completed machine. I mean I did not see the completed machine installed. Let me correct my answer.

Q. You saw the completed machine before it was installed, is that correct?

A. To the best of my memory, I have a vision in my mind of that machine; so that I feel confident that I saw the machine; but I did not see it installed because that occurred just after I had left the company.

Q. Was the machine which you designed similar to the general configurations of the machine illustrated in patent 1,659,435?

A. In general, yes. That is not a—this is very diagrammatic, but in general, yes.

Q. Was the reason that you did not install a combined snow-forming and block-pressing machine between, say, the late summer of 1925 and 1928, to which you have just referred, that the combined machines which both

(Testimony of James W. Martin)

produced snow and pressed [1028] were not capable of operating commercially?

A. No. They operated commercially. We sold the ice.

Q. What was the reason for not building one until 1928? A. Lack of development funds.

Q. Was the Dry Ice Corporation reorganized about that time?

A. Yes; it was reorganized and more money was put into it.

Q. Do you have a financial interest in any of these defendants, Mr. Martin? A. I have not.

Q. You have referred to the fact that these early 1925 machines were built by Eppenbach, is that correct?

A. That is correct.

\* \* \* \* \*

Mr. Miketta: I would like to have the clerk mark for identification photostatic copies of pages 240 to 245, pages 412 to 427, and page 433 of certain records bearing at the top "Prest Air Corporation", said photostats having attached thereto a certificate of Edwin S. Eppenbach and a sketch or diagram. [1029]

The Court: It may be so marked for identification.

[Note: Defendants' Exhibit R will be found in the Book of Exhibits at page 1377a.]

\* \* \* \* \*

Q. By Mr. Miketta: Mr. Martin, did you ask to see any of the books or records kept by Eppenbach in your last visit to him? A. I did; yes, sir.

(Testimony of James W. Martin)

Q. Did you see such records?

\*     \*     \*     \*     \*     \*     \*     \*

A. I saw the account book of Eppenbach.

Q. By Mr. Miketta: What did it look like?

A. Well, it was a brown book, looked like most any other ledger, account book.

Q. How thick?

A. It would go an inch and a half thick, 16 inches long, and around 8 inches wide.

\*     \*     \*     \*     \*     \*     \*     \*

Q. By Mr. Miketta: Did you take any photostatic copy of those records?

A. I did. I took them down to— [1030]

\*     \*     \*     \*     \*     \*     \*     \*

A. I took the book that Mr. Eppenbach had found in his pile of old records to a photostat company, 120 Broadway, New York City, and had the pertinent pages photostated, and I returned the book of Mr. Eppenbach.

\*     \*     \*     \*     \*     \*     \*     \*

Q. By Mr. Miketta: I show you Defendants' Exhibit R for identification and ask you whether these pages constitute those which you photostated from Mr. Eppenbach's records?

Mr. L. S. Lyon: The same objection.

The Court: Oh, you may answer yes or no.

A. Yes; they are.

Q. By Mr. Miketta: I call your attention to the top sheet on these records. Do you recognize the signature appearing thereon?     A. I do.

Q. Did you see Mr. Eppenbach sign that?

A. I did.



(Testimony of James W. Martin)

Mr. Miketta: I would like to have these introduced in evidence, your Honor. [1031]

Mr. L. S. Lyon: I would like to examine the witness on voir dire before making an objection, your Honor.

The Court: Yes, sir.

Q. By Mr. L. S. Lyon: Have you read these records, Mr. Martin? A. Yes, sir.

Q. Do you have personal knowledge of each of the transactions appearing thereon?

A. Those pertaining to the—

Q. Just answer the question.

A. All right. Excuse me.

Q. Well, excuse me. Go ahead.

A. Those pertaining to the snow press and to some of the refrigerating equipment. To all of those pertaining to the snow press and to many of those pertaining to the refrigerating equipment.

Q. I call your attention to the item on page 425 under date of May 26, reading: "Repairing door on refrigerator box at General Carbonic plant for Dry Ice Corporation of America, total amount \$8." Do you know what that transaction was?

A. I think that there was a mistake made by the secretary or the bookkeeper when he put "General" instead of "Liquid".

Q. You think so, but do you know what this transaction was?

A. Do you want me to pick out which box it was repaired? [1032] It was probably one of these

(Testimony of James W. Martin)

Q. Do you have any recollection of that transaction, that particular transaction?

A. Picked out of its context, no. I would in general if they were fixed in a door on one of those previous boxes.

Q. This is a record of May 26, 1925 showing a payment by the Dry Ice Corporation of America to the Eppenbach concern for repairing a door at the refrigerator box at the General Carbonic plant. According to your recollection was there such a device at the General Carbonic's plant on May 26, 1925 which was or just had been repaired for the account of the Dry Ice Corporation of America?

\* \* \* \* \*

A. My answer is no. [1033]

\* \* \* \* \*

Q. Where are the records from which these photostats were taken, Mr. Martin?

A. The last I saw of those records I handed back to Mr. Eppenbach at his place of business in Long Island City, New York. [1035]

\* \* \* \* \*

Q. By Mr. Foster: Did you, Mr. Martin, at the time that you saw the books, and had them photostated, as repre- [1039] sented by Defendants' Exhibit R for identification, request permission to bring the books to this trial?

A. I did.

Mr. L. S. Lyon: Same objection, and I move to strike the answer.

The Court: I think it is a little out of order. I would have let it go in a little earlier, so I guess I will leave it as it is. At this time I don't think it makes

(Testimony of James W. Martin)

much difference under the present ruling, except as an excuse for failure to bring in the originals.

Mr. Foster: One other question, Mr. Martin: Was that permission granted? A. It was not.

\* \* \* \* \*

### Cross-Examination

Q. Were you continuously employed by the Dry Ice Corporation at the plant of the General Carbonic Company, to which you have referred, from the time you moved from the Maspeth plant to the time you moved to the Yonkers plant?

A. I personally was not continuously so employed, no.

Q. Give us the dates that you were so employed between [1040] those two occasions?

A. May I ask for a clarification?

Q. Yes.

A. When you say was I employed, you don't question the fact that I was employed by the Dry Ice Corporation? There was no hiatus in my employment with the Dry Ice Corporation. That is not what you are asking?

Q. Let us start out a little further back. You entered the employ of the Dry Ice Corporation when?

A. January 16, 1925.

Q. When did you leave their employ?

A. November 30, 1928.

Q. Were you in the employ of the Dry Ice Corporation continuously between those two dates?

A. I was.

(Testimony of James W. Martin)

Q. Your first employment was at the Maspeth plant, to which you have referred?

A. My first employment was at the offices of the Dry Ice Corporation on 42nd Street in New York. I spent considerable time at the laboratories of the Prest Air Corporation, which were in Long Island City. When the press was completed, I spent most of my time, not all of it, but most of my time, at the plant at Maspeth, Long Island.

Q. When was that move made to the General Carbonic plant?

A. To the best of my memory, it was about September [1041] of 1926.

Q. How do you fix that date? Have you any means of fixing it definitely?     A. No.

Q. Are you sure you are not wrong by a year?

A. I have heard the testimony given in open court here, and I have racked my brains to try to reconcile the dates I have given, and I am sorry, in all honesty I can't reconcile it.

Q. I am asking you this: Are you sure that you are correct, and there is no possibility of your being wrong within one year?

A. There is a possibility, yes, because I am remembering back 18 years.

Q. From the time the plant was moved to the General Carbonic plant until it was moved out to Yonkers, were all of the activities of the Dry Ice Company carried on in the General Carbonic plant?

A. All I knew anything about, and I should have known.

(Testimony of James W. Martin)

Q. During this period there was nothing being done at Maspeth?

A. If it was done, it was done without my knowledge.

Q. How much time did you spend at the General Carbonic plant during that period?

A. Probably one-fourth of my total time. If you wish me to, I would say that I was over there four days [1042] out of seven.

Q. For about how long each day?

A. Anywhere from an hour to all day and part of the night.

Q. You were familiar with whatever equipment was being employed in that plant at that period, for the manufacture of dry ice, were you not? A. Yes.

Q. I show you a photograph, and ask you if you can identify anything which appears on that photograph.

Mr. Foster: May we see the photograph?

The Court: You may all come up here and look at it. We will all see it at the same time.

A. I would say that, from the background, that this is a corner facing on Sixth Street, at the General Carbonic plant at Long Island.

Q. By Mr. L. S. Lyon: Is that a corner of the room in which your company manufactured dry ice?

A. As nearly as I can say, from the picture, I think it is the exact spot.

Q. Did you ever see the piece of equipment which appears in the foreground of this picture?

A. Yes, I did.

Q. When?

A. I came back, after we had gone to Yonkers. This door was open along here, and I peeked through the door, sir. [1043]



(Testimony of James W. Martin)

Q. That was the first time you saw it?

A. Yes, sir.

Q. It is your testimony, is it, that this machine as it appears in this photograph, was not in that location until after what date, to your knowledge?

A. The best I can remember, we did not leave, the Dry Ice Corporation did not leave Sixth Street and East River until the fall of '27.

Q. Have you any means of fixing that date with any certainty?

A. We moved the plant up to Yonkers. Conditions up there we found very unsatisfactory. We immediately started to getting the design ready for a plant of our own at Elizabeth. The plant was designed the last part of 1927 and the first part of 1928, and it was built in 1928, and completed about, I imagine, near the summer of 1928.

Q. Is there any possibility that you are wrong in your recollection, and that you actually moved out of the General Carbonic plant on September 27, 1926?

A. September 27, 1926? I am trying to remember back that long, and I could be mistaken, yes.

Q. If you did not move out of the General Carbonic plant until some time in September, or October, of 1927, this picture that you have in front of you could not have been taken early in 1927, could it?

A. If we were still there, this space, as nearly as [1044] I could tell it, was occupied by our snow tanks.

Q. Is it your positive testimony that this machine, as it appears in this photograph, was not just where it

(Testimony of James W. Martin)

appears in the photograph early in 1927, in the General Carbonic plant?

A. You will have to refer to my previous answer. I have tried to fix these dates to the best of my ability, but there is a chance that I was wrong.

Mr. L. S. Lyon: I would like to offer this photograph for identification, on the cross examination of the witness.

The Court: It may be received.

The Clerk: Plaintiffs' Exhibit 20.

[Note: Plaintiff's Exhibit No. 20 will be found in the Book of Exhibits at page 1351.]

The Court: It may be received in evidence for the purpose of explaining the testimony of this witness, and will save marking it for identification.

Q. By Mr. L. S. Lyon: You have given us the figures for the production of dry ice at the Maspeth plant in the month of June, on up to the month of July, 1925. Can you give us the figure for July, 1925?

A. No, the figure I gave was an approximate division of the total tonnage for that year, remembering how many customers we had, how many snow tanks we had. And I have tried to reconstruct in my mind how much ice was made, and then I gave that rough figure.

Q. What period of time was covered by that production [1045] that was included in that figure?

A. I believe the question was how much production was made prior to July 3, 1925, at the Maspeth plant. It was my best recollection that it was somewhere between 20 and 30 tons were produced before July 3, 1925.

(Testimony of James W. Martin)

Q. I think perhaps you are mistaken. I meant July 3rd?  
A. July 3rd, yes.

Q. You have a definite recollection within that limit of 20 to 30 tons, that 19 years ago, before that particular date, that was the amount of ice produced, is that correct?

A. That is the reason I explained as I did, sir. Of the 135 tons made in that year, which was a fairly definite figure; it is trying to reconstitute how we worked. It is my best judgment that we produced between 20 and 30 tons prior to July 3, 1925.

Q. According to your recollection, by July 1, 1925, the machine to which you have referred had reached the form shown in diagram 3 of Exhibit P; is that correct?

A. Yes.

Q. Was that machine ever changed after then?

A. In order to answer that question intelligently I will have to answer it in this way: There were three of these machines; two of them remained in the form as shown in Exhibit O, diagram 1. This other plant, in which we have taken off the hopper, was either kept in the condition [1046] as indicated in the diagram 3, or was dismantled. There was some corrosion, and it is possible it was dismantled.

The Court: The other two?

A. The other two remained substantially as diagrammatically indicated in Exhibit O.

Q. By Mr. L. S. Lyon: Was more than one of these machines, as shown in Exhibit O, or with the modification you have just explained, actually operated to make dry ice?

A. I can remember only one being operated.

(Testimony of James W. Martin)

Q. According to your recollection, what was the date of the last manufacture of dry ice in that machine?

A. It was probably the end of June. That is about the best I can say, because when the rush commenced around July 4th, we had to produce ice faster than the machine could be producing it. We used our gas and our man power in producing ice in the snow tanks.

Q. You want to be understood as testifying that the Dry Ice Corporation from that period on, until you left its employment, did not have enough money to build a larger machine of that type: is that correct?

A. We couldn't get money appropriated for that purpose.

Q. You never actually attempted to build a machine of that type to produce a product of a 10 by 10 cross section, did you?

A. You are speaking now of the type indicated in this [1047] diagram?

Q. Yes.

A. No, the type was, as I explained, from a different type of machine.

Q. You say that you designed this Elizabeth plant before you left the company, and the construction and installation was under way. In round figures, how much did the Dry Ice Corporation expend on that plant?

A. Before they got through it was over \$300,000.

Q. Nearer \$600,000, wasn't it?

A. I remember the figure \$300,000, because we were surprised at it going that high. You include land and all, do you, in the plant?

Q. Whatever you expended, in putting in that plant.

A. You may be right.

(Testimony of James W. Martin)

Q. You say that you moved all your equipment over to the General Carbonic plant from Maspeth; is that right?

A. All the dry ice equipment. I can't remember exactly what I testified. I tried to leave the impression, and it is a true impression, that we removed the snow tanks from the Maspeth plant, and took them over to Sixth Street and East River. I remember we had several snow tanks we had discarded. Whether we left our discarded snow tanks over there, as of no particular value, I don't know. There were some snow tanks left at Maspeth, but for all operating purposes we took all the equipment over to [1048] Sixth Street and East River.

Q. How definite is your recollection that you actually moved any snow tank equipment from Maspeth to the General Carbonic plant? Have you got a clear recollection of that?

A. You want me to remember the actual transition of these snow tanks on their way over, or do you want me to remember the finished results?

Q. I want to know, have you got a clear recollection of the fact that you moved snow tanks from Maspeth to the General Carbonic, when this transfer was made of the dry ice activities from Maspeth to the General Carbonic.

A. To the best of my memory we did, yes.

Q. Have you got a clear recollection that you did, or might you be mistaken about that?

A. Sir, when you ask me whether I might be mistaken about these things, I think my best answer is, to my best knowledge and belief that was the fact.



(Testimony of James W. Martin)

Q. Maybe I can refresh your recollection. Can you remember anything about what happened when you first attempted to start your operations at the General Carbonic plant, after moving over from Maspeth, the first few days? Can you remember what transpired?

A. Do you mean until we got our tanks set up, we made snow just any way we could to fill our orders?

Q. Do you remember those first few days, what you [1049] actually did? A. I can remember troubles.

Q. Can you remember in what apparatus you made the first snow, or the first dry ice that you produced at the General Carbonic plant, on moving over there?

A. I have a recollection of making, while the tanks were being brought over from Maspeth—they were at Maspeth, and while they were being brought over to Long Island City, I have a very hazy recollection of making snow in bags.

Q. Are you sure you were waiting for the tanks to be brought over from Maspeth, or for some new snow tanks to be constructed by the General Carbonic Company?

A. We got some new tanks, but as I remember, we were waiting for the tanks to come from Maspeth. [1050]

\* \* \* \* \*

Q. By Mr. L. S. Lyon: How many of these machines of Exhibit P type do you actually remember bringing to the General Carbonic plant? [1051]

Mr. Foster: We make the same objection, your Honor: it has been asked and answered on cross examination.

(Testimony of James W. Martin)

The Court: I am not sufficiently sure, so I will let him answer again.

A. I remember a machine of the O type setting in the yard just outside of the building in which we made snow. It was—

Q. In the scrap pile? A. In the scrap pile.

Q. Did you put it there?

A. No, I didn't put it there. It was put there under my general supervision. I was not directly in charge of the work. In those days I think I was assistant to the president, or some such high-falluting title. The man actually in charge was Hood, but I can remember seeing a press of this general description sitting out in the bone-yard.

Q. Do you remember actually seeing it moved there from Maspeth?

A. No, it could have been moved there when I was not there. It could have.

Q. How many snow tanks did you move over to the General Carbonic plant from Maspeth, do you remember?

A. I think we moved three of them.

Q. What became of the other two of these devices of the type shown in Exhibits O and P? You say there were three of them. What became of the other two, do you know? [1052]

A. One set outside of the Maspeth plant, and I think eventually it went back to the Eppenbach place.

Q. I did not ask you that. I asked you what became of the other two.

A. That I have a recollection of going over to Sixth Street and East River. I am trying to think of the other two you asked me about. One sat outside of the Mas-

(Testimony of James W. Martin)

peth plant, and one probably—I can't remember distinctly, but probably it was taken up to Eppenbach's place. We tried to get some refunds on it.

Q. What became of the third one?

A. I am sorry, I can't remember the third one. As I remember, it was this Exhibit P type. I can't remember where that one went to after we finished with it.

Q. Do you have a recollection of Mr. McLaren ever seeing this one of these machines that you say was out on the scrap pile, at the General Carbonic?

A. No, I have no recollection of his having seen it.

Q. Have you any recollection of Mr. Cole ever seeing it?

A. I have no recollection of his seeing it.

Q. Or any of the other engineers at General Carbonic Company ever seeing it, while you were there? Did you ever see any of them looking at it?

A. No, I didn't see any of them looking at it.

Q. How big a scrap pile was this?

A. I would say it covered an area of 40 feet long, about [1053] a foot high, and was about 8 feet wide.

Q. Was this machine set upright in the scrap pile, or was it lying over on its side, or what was it doing there?

A. My memory is of seeing that sitting upright, and it was on the side of the pile toward the street.

Q. You say that you had a discussion, at which Mr. McLaren was present, in which Mr. McLaren complained of the gas that your company was wasting, and that you made the suggestion that an apparatus could be built in which the solidification and tamping and pressing could all be performed in one apparatus, is that correct?

A. That is correct.

(Testimony of James W. Martin)

Q. What was the date, as nearly as you can remember, that you had that conversation?

A. It was within two months of the date we moved in and started operating at Sixth Street and East River.

Q. If you moved in in September, 1926, that date would be sometime in—

A. In October, probably.

Q. October or November, 1926?                      A. Yes.

Q. If you moved in in September, 1925 when was that date?

A. If we moved in in September of 1925 then it would be either the month of September or the month of October. What I have said is within two months elapsed time; not two specific calendar months. [1054]

Q. Was Mr. Cole present at that conversation?

A. No, I don't remember Mr. Cole being present. I don't think he was.

Q. Was there more than one of these conversations at which you made any such suggestion, or just this one to which you have referred?

A. I remember, because we were a little anxious about getting thrown out of the plant, because we were wasting carbon dioxide.

Q. What were you doing, that you were wasting carbon dioxide?

A. We couldn't help it, in the operation of the snow tank, and the tamping and the pressing, if those are done in separate places: when you open the doors of the snow tank, all the pressure that is in the tank leaks out around the door. I think it is much more visible than it is real actual pounds; it is very visible foam of carbon dioxide which pours out and covers an area of 6 square feet,

(Testimony of James W. Martin)

and it looks like an awful lot of gas being lost. When you tamp a certain amount of the gas is lost, and finally, when you put it in the press, the gas escapes from the ice as you press it.

Q. When did you design the snow tanks which you built or operated at Maspeth, and those which were built and operated at General Carbonic?

A. The ones we used at Maspeth were designed just on diagrammatic sketches, shall we say, to meet an immediate need, [1055] and they were produced very quickly. You dignify them to say they were designed. They were sketched out on rough paper, and taken over to the machine shop, and they made them up according to our sketches.

Q. I would like to get the date of that.

A. That was done about the time we got this order from Breyer, which fixes it fairly definite in my mind, that was made in June of 1925.

Q. Contemporaneously with the work that is reflected on Exhibits O and P?

A. Contemporaneously with the latter part of that work, yes.

Q. Is that all the designing that you were doing during that period for the Dry Ice Corporation, or were you designing other things besides?

A. I was occupied to some extent with the design of use equipment, refrigerator boxes, but most of my time was in this manufacturing type, and George Kusack, who has been mentioned before, was very interested in the use; the customers' boxes, and things of that kind, so I had a partial knowledge, but not a complete knowledge of that work.



(Testimony of James W. Martin)

Q. What you have down here only reflects a portion of the different ideas that you had which you suggested at that time, and worked on, in connection with the apparatus for making dry ice? You had numerous other schemes, did you not?

A. What time are you talking about, sir? [1056]

Q. From January, 1925, to September, 1925.

Mr. Foster: That is objected to, because the question is compound and is in at least two parts, and is indefinite.

The Court: He can answer.

A. In the spring of the year we would get pushed for production, and I was putting all of my time and attention on getting the ever-increasing production out of these presses of the types shown in Exhibits O and P, and the previous exhibit.

Mr. L. S. Lyon: That is hardly an answer to the question.

A. I am having to answer your question in three parts. During that time my attention—in other words, I did not give, during that period, which would be in point of time, from January to, say, sometime in May, all of my time to this press. Then force of circumstances forced me to give my time to the designing of the snow tank. It was a hurried job. After the peak of the production was over, and I had some time, then I started to work with Mr. Dean, our patent attorney, trying to get my ideas rounded up for patents.

Q. Who was Mr. Dean?

A. Mr. George Dean was the patent attorney for the Dry Ice Corporation, during the entire time of my employment.

(Testimony of James W. Martin)

Q. He was the man who prepared, as attorney, and filed the various applications in your name, which your attention has been called to here today?

A. He was. [1057]

Q. Did you ever file an application on any of the ideas that are incorporated in this machine shown in Exhibits O and P?

A. Some of the ideas, yes; no diagram on a patent;—no drawings on a patent reflected this piece of equipment.

Q. You did file an application on your snow tank, did you not? A. Yes.

Q. Why did you file an application on your snow tank, and not on this equipment?

A. The snow tank was filed because it was the piece of equipment on which we were making our production. After this first initial operation we had put our snow tanks into several places, and we had an ambition to put them in other places, because that was out in public view, and we thought we had better get our patent application in on it. That influenced us to take that first, and almost concurrently with that, you will notice from the filing date, we were trying to get a snow press and snow tank in one chamber, under one housing.

Q. You did, during that period, file numerous patent applications on other things that were not being used at all commercially by the Dry Ice Company, did you not?

A. Use patent you have reference to? Yes, I did.

Q. Various patents? A. Yes, I did. [1058]

Q. Referring now to Exhibit L, in this device what was the speed of the rotation of the crank that reciprocated the plunger?

(Testimony of James W. Martin)

A. Let me time myself. Possibly five times a minute; five R. P. M.

Q. What determined the limit of travel of the plunger? A. The diameter of the drive wheel.

Q. So the plunger could reciprocate approximately the length of the diameter of the drive wheel, is that correct?

A. By the diameter of the plunger on the drive wheel, on which we attached the crankshaft.

Q. It has been suggested that that was a compacting action analogous to tamping, as distinguished from a pressing operation in a press. What have you got to say about that?

A. It would be, if the thing was running free, it would be analogous to tamping. It is properly incremental pressing—pressing new increments in. It didn't operate very satisfactorily in that manner. The nearest it would operate was by allowing it to withdraw to the position shown here, and not driving it against pressure. It was almost impossible to drive it in the later stages of this development.

Q. You have said you used this C clamp at the end sometimes, and other times you operated the machine as an extrusion machine? A. Yes.

Q. Did you use the C clamp just to make the first block? [1059]

A. When it was operated as an extrusion machine we used the C clamp only to start the first block, to compact it.

Q. To what extent did you use this machine other than as an extrusion machine?

A. We got the best results when using it not as an extrusion machine. The major portion of the time was

(Testimony of James W. Martin)

making the block, taking off the C clamp, taking that block out, and starting fresh, and making another block. [1060]

Q. Now, did you have any difficulties with the machine when you so operated it?

A. I will have to answer that question this way—and bear with me, will you? If you were an engineer asking me that question, I would say yes; any new machine you have trouble with it of all kinds. As you asking me as an attorney, I think I should answer that no insurmountable troubles, because we made commercial ice and we sold it.

Q. The total amount of ice that was ever made on the machine was something about 20 tons, I think you say, is that right?

A. It would not exceed 20 tons, and that was pretty close to what it made and we sold.

Q. And those were all these small blocks, 3 inches by 3 inches?

A.  $3\frac{1}{2} \times 3\frac{1}{2} \times 8$  inches was the approximate size.

Q. And the 8 inches was their length as they extruded from the machine?

A. Yes; on the extrusion ones that was the length. We cut them up into 8-inch blocks as they came from the press.

Q. And the cross-section of the chamber was  $3\frac{1}{2}$  inches, was that right?

A. That is right; yes. Some of those presses—you recognize that some of those blocks must be a little bit smaller dimensions after they had gone through the retarding nozzle. [1061]

(Testimony of James W. Martin)

Q. What was the production of this machine per hour, if you ever determined it?

A. I never determined it. Oh, it would be a rough guess. I would have to reconstitute. I don't remember ever weighing it for any hour's production.

Q. As nearly as you can estimate it, what production did you actually obtain in your average results on this machine?

A. Oh, we ought to run in—we might get 60 blocks an hour.

Q. How many of those blocks would it take to make a ton?

A. I don't remember the weight of those blocks. I remember they weighed about four pounds, though.

Q. Did you ever have any spoilage?

A. Oh, yes.

Q. In operating the machine?

A. Yes; we had spoilage.

Q. About what was your spoilage rate in the operation of that machine?

A. We, fortunately, were able to sell most of our spoilage, so—

Q. Well, but what was the spoilage rate?

A. Ten percent. I think that is approximate.

Q. What is the longest continuous operation of the machine that you obtained, or the longest period of time without having to shut it down because of something going wrong? [1062]

Mr. Miketta: Objected to as assuming something not testified to by the witness, your Honor.

The Court: Oh, well, I guess that is, again, a matter of common knowledge. I think that, according to his



(Testimony of James W. Martin)

statement there, they had trouble with it. And you did occasionally have to shut it down to make adjustments or repairs, etc.?

A. Yes, sir. I would have to just guess if I answered your question.

Q. By Mr. L. S. Lyon: You had to shut it down frequently, though, didn't you?

A. Yes; it was shut down frequently for very brief periods of time.

Q. What was the cause or what occasioned those shut-downs?

A. There was, of course, the—this would not hardly be called a shut-down—we had to stop the motor power of the machine when we were snowing in, snowed in and make a block and then started up again and pressed that.

Q. You were not including that in your answer?

A. No. I am just trying to find out from you what you include.

Q. No. I mean where something went wrong with the machine and you had to shut her down and get going again.

Mr. Miketta: Objected to, your Honor, as not identifying the particular machine in question.

Mr. L. S. Lyon: We are talking about this machine from [1063] the time you started it as the form shown in Exhibit L through to the last form you had it in that you have indicated in your testimony in connection with Exhibit, I think it is P.

A. This is just guess, but somewhere in the neighborhood of two hours of straight run, then there was a short shut-down. The shut-downs we refer to are not

(Testimony of James W. Martin)

breakdowns or things of that kind; they are merely you stop to adjust something.

Q. Have you ever had any experience with any other type of extrusion machine?

A. Yes; we filled shells in the last war with an extrusion machine.

Q. In an extrusion machine, from your knowledge as an engineer, the problems magnify as you increase the cross-sectional area of the material being extruded; is that a correct statement?

A. That was true in handling amytol in the last war; that was my experience.

Q. You, as an engineer, would say you would experience the same thing in trying to make a machine as shown in these Exhibits L to P if you tried to make a block of a cross-sectional area of material 10 x 10?

A. Well, am I permitted to ask you what time, when I thought that, whether I was thinking that when I was doing this, or what I think now? [1064]

Q. What do you think now?

A. Well, since that time I had heard about the troubles that my friend back here had with his machine at Sixth Street and East River, and I know he had a lot of trouble with it; so now I would say yes; you would have trouble. In those days I thought right probable that you could make that machine larger.

Q. But you are pretty well convinced you would have an awful time with it doing it now, aren't you?

A. Now, yes.

Mr. L. S. Lyon: If it is all right with you, your Honor?

The Court: Yes.

(Testimony of James W. Martin)

Q. Your maximum was about a ton a day; that would be the very maximum, wouldn't it?

A. Yes. I think we may have made a little bit more than that, sir, but that was just about.

The Court: I was just thinking about the average. If you did a ton a day—

A. We did a darn good job.

Q.—you think you were doing a good job?

A. We were; yes.

The Court: We will adjourn until tomorrow morning.

(Whereupon an adjournment was taken until 10:00 o'clock a. m. the following day, Thursday, May 18, 1944.)  
[1065]

Los Angeles, California, Thursday, May 18, 1944;  
10:00 a. m.

(Parties present as last noted.)

The Court: You may proceed.

JAMES W. MARTIN,  
resumed.

#### Further Cross-Examination

Q. By Mr. L. S. Lyon: Mr. Martin, I hand you a copy of United States patent 1,887,692, granted November 15, 1932, on a divisional application, the parent application being filed December 6, 1926. Are you the James W. Martin, Jr., named in the patent? A. I am.

Mr. L. S. Lyon: I will ask that this patent be received into evidence on the cross examination of this witness as Plaintiffs' Exhibit—

The Clerk: 21.

(Testimony of James W. Martin)

Mr. L. S. Lyon: —21.

The Court: Is that listed in this group?

Mr. Miketta: Yes; it is, your Honor.

The Court: Which number?

Mr. Miketta: 1,887,692.

Mr. Foster: I believe it is tab 24, your Honor.

The Court: This is now Exhibit 21?

The Clerk: 21.

[Note: Plaintiff's Exhibit No. 21 will be found in the Book of Exhibits at pages 1353 and 1522.]

Mr. L. S. Lyon: That is all, thank you, Mr. Martin.  
[1066]

The Court: Any further questions?

Mr. Miketta: Yes, your Honor.

#### Redirect Examination

Q. By Mr. Miketta: Mr. Martin, were you as constantly at Maspeth after the summer of 1925 as you had been during the spring and early summer of that year?

A. I was not.

Q. In order to clarify the operation of the machines to which you have referred and in which solidification took place and blocks were ejected or formed as illustrated by Exhibit P, Figs. 2 and 3, is it our understanding that the present plunger progressed toward and away from the outlet of that machine at a rate of about five times a minute?

The Witness: Will you read that question again, please?

(Question read by the reporter.)

A. That is right.

(Testimony of James W. Martin)

Mr. L. S. Lyon: If your Honor pleases—

Q. By Mr. Miketta: Is that a correct statement?

Mr. L. S. Lyon: —I think I will ask counsel to remove the term “our understanding” in the question.

Mr. Miketta: I will rephrase the question, your Honor.

The Court: Never mind rephrasing it; just eliminate that. Is that your testimony, that there were five complete cycles per minute forward and back? A. Yes.

Q. By Mr. Miketta: Was the pressure within the chamber, or [1067] did the pressure within the pressing chamber influence the rate or the number of pressing strokes per minute?

A. If there was appreciable pressure within the chamber, we would have to stop the operation until the pressure was relieved by this valve I have indicated as a vent to relieve the pressure to atmosphere.

Q. So that under those conditions the pressing plunger did not actually move at the rate of five times a minute, but it was stopped and then performed a pressing operation, is that correct? A. That is correct.

Q. And referring now to the operation in which you made your snow in a snow tank and then pressed the snow in the molds, prior to the use of the hydraulic press, do you know the approximate pressures per square inch which were exerted on that block during that pressing operation?

The Court: Are you speaking about the pressing operation or the tamping operation?

Mr. Miketta: The pressing operation in the mold by the hydraulic press, your Honor.

A. The pressure was in the neighborhood of 800 to 1200 pounds per square inch on the block. [1068]



(Testimony of James W. Martin)

\* \* \* \* \*

Q. By Mr. Miketta: Mr. Martin, during the pressing of snow in the molds and by the use of the hydraulic press did you observe the entry or exit of any gas from that snow?

A. The gas is always flowing from the snow toward the atmosphere; the carbon dioxide gas is flowing from the snow or from the ice outwards away from the snow or ice.

Q. And there is free space for the exit of those gases, is that correct? A. In the tamping operation?

Q. Let us just talk about the molding or pressing of the snow.

The Court: In the press.

Mr. Miketta: In the hydraulic press.

A. Yes; there is space around the loose-fitting plate for the escape of the gases.

Q. Did you observe air entering the block or snow during that pressing operation, or is that possible, in your opinion?

Mr. L. S. Lyon: The same objection.

The Court: Objection sustained.

Q. By Mr. Miketta: If gas is escaping from that snow during the pressing operation, Mr. Martin, is it possible for air to enter the snow, in your opinion?

A. It is not possible.

The Court: I suppose it is proper cross examination, but I would like to have you explain to me so I will understand it; I suppose I have got to understand it ultimately, and I [1070] might as well find out now.

A. So long as you have carbon dioxide in its solid form, whether in snow or in ice, it is evaporating. It

(Testimony of James W. Martin)

cannot stay stationary or still, and if snow, or ice is at any pressures below the triple point, it must exaporate, no matter if you had it under very low temperature, it must evaporate.

The Court: That is what you call sublimed?

A. Yes, sublimed. Every particle of snow is contributing by this evolution to gas, because every particle of snow is below its triple point, the point at which it must evaporate; therefore the flow of gas is both interstitial and on the surface. There is a flow of carbon dioxide; the solid carbon dioxide is bathed in the carbon dioxide gas. Particularly is that true when you are manipulating solid carbon dioxide. Where pressure is being applied to it, there is a large evolution of the gas when you are manipulating it. The gas that has been entrapped is coming out also, so it would be impossible for air to enter the interestices of the snow or ice, because of the rapid outflow.

The Court: That is on the theory that you can't have two streams running in opposite directions, that is, full volume, in a conduit, at one time?

A. That is correct.

Q. Would that same theory be true in this type of device? A. Yes.

Q. In a conduit, if you have it partially full, and you [1071] may have two streams running in opposite directions, if the conduit has maybe an inlet or outlet.

A. A double flow in a conduit calls for a conduit with a relatively large size as compared to the outflow. In this case the interstices are relatively small, so that no air can enter against the flow.

(Testimony of James W. Martin)

The Court: If I had understood your question to be limited that way I would not have asked this question. I did not understand it was so limited.

A. The question has two or three sides. You are making snow, tamping it, and pressing it in the molds. You remove it and put it in the mold. The mold is sitting, first, on a lower platen, so there is a small aperture between the periphery of the mold and the platen. At the top of the mold it has a loose-fitting steel plate. Gas evolving from the snow flows through the restricted aperture between the plate and the sides of the mold, so that no air enters the snow at this point.

The Court: It is almost the same condition above and below?

A. Yes; in both cases there is a small aperture between the sides of the mold and the platen, which makes the double flow, which you mentioned, impossible. You have another situation when tamping. Your mold is sitting on a flat table, so the bottom condition is the same as when you are pressing. In this case, you are consolidating or pressing [1072] the lumps of snow into an open-mouthed vessel, so that the backflow of the gas, while not violent, is sufficient for you to observe it flowing upward out of the mold. I have actually personally done this with my own hands, so it is not of academic interest. The cold gas is visible as it comes in contact with the humid atmosphere. It can be observed flowing over the edges of the mold and down the outside of the mold. In no case does the air penetrate the stream of carbon dioxide, so it cannot penetrate the body of ice in the mold.

The Court: I understand that. The thing I was visualizing was this: Suppose you were operating your

(Testimony of James W. Martin)

press to make triple point ice, we will say, that is almost 100 per cent perfection. On one side of the block there would not be gas escaping on that side, necessarily. Theoretically, there might be no gas going off that side.

A. You will have to have gas escaping at any time up to the time of the triple point. The ice is never stable at atmospheric pressure, at any temperature.

The Court: Yes, that is true.

Mr. Miketta: Your Honor, may I state this: There has been some testimony that air entered the snow during tamping, in this operation, and I want to clarify that point with Mr. Martin while he is on the stand.

The Court: That's got me a little confused.

Mr. Morris: I think probably the statement of learned [1073] counsel is directed to something I said. If so, my recollection is this: When you shovel snow out of the snow tank on a humid day, or any day, and shovel that snow into the mold into which it is to be later pressed, then you have commingled with the snow you are shoveling, the air. I do not recall making the remark that air entered during the actual pressing operation. That is foreign to any thought that I have, if I ever had any such thought.

The Court: That is why I am asking these questions. Naturally, when you are taking the snow out of the chamber, and putting it into the tank, you are going to have contact with atmosphere; when you are taking it out of the tank and putting it in the press, you are going to have contact with atmosphere, and when you have got two platens in a solid box, with restricted orifices, and the gas is coming out, no air would get in.

Mr. Morris: There is no doubt about that.

(Testimony of James W. Martin)

The Court: I thought there was some conflict.

Mr. Morris: The tamping is to exclude that air that has gotten mixed in during the shoveling of the snow from the snow tank into the mold; and you are getting as much as you can get of the CO<sub>2</sub> gas out at the same time and during the pressing the gas is flowing out.

The Court: Then there may be air in there that is going to go out with the gas.

A. Sir, that isn't my experience. When you are [1074] shoveling the snow out you are taking broken chunks of snow out, and it is certain while so much gas is coming off, there is not commingling of air. In other words, when this snow is put down into the mold there would be no opportunity for any air to flow against the stream of outrushing gas. If your Honor will permit, I think I can resolve the difference in the points raised by counsel.

The Court: Go ahead.

A. In inexpert operation, in careless operation of the snow tank, you will open the door, and the air will rush in, and will be condensed on the sides of the snow tank, and be condensed in the upper strata of gas layer. Always on the top of the layer of cold gas you will condense and freeze the moisture of the air. This being heavy, will precipitate down on the snow.

Q. By Mr. Miketta: Under what conditions would air rush into the snow tank?

A. Only when the tank has been left open for an unusually long time. The same condition would obtain when one produces ice in the snow chamber. There, again, if an inexpert operator operates it, he drops the bottom platen, and I have seen this done—the man leaves



(Testimony of James W. Martin)

the bottom platen down, and the gas being heavy falls out of the chamber by its own weight, and the air rushes up into the snow chamber to take the place of the gas. The water from the air condenses on the cold sides of the chamber, and [1075] falls on the next block, and forms a water ice layer on the block that comes from the vertical press, as shown in Figure 5. The same condition occurs in both cases.

An inexpert operator will permit air to flow into the chamber when the separate snow tank is part of the press, just the same as he would in the case of the snow tank. I believe a little misstatement has been made, when it was said that the air was occluded between chunks of snow put in the mold, because there is too much outrushing gas. In the 10 by 10 mold sufficient gas is coming out, so the air is purged from the upper portion of the mold by the outgoing CO<sub>2</sub> gas.

Mr. L. S. Lyon: The point of my objection is that the witness has not laid any foundation for the diagram, I am informed, by actual measurement. The witness has not testified to having made any measurements along that line, showing at the point indicated on the diagram, the CO<sub>2</sub> which is indicated on the diagram, that the atmosphere at that point contains 50 or 60 per cent air, and no one can trace accurately what the witness is testifying about unless he had made some measurements.

The Court: Give us your judgment about that.

Mr. Miketta: May we see what that is, your Honor?

The Court: Come right up.

A. I think this could be essentially correct. (Referring to diagram.) It all depends on what portion of this gas you are to take your sample. You have your

(Testimony of James W. Martin)

mold. [1076] The mold is 16 inches high, in that general neighborhood, by 10 by 10, which is shown here. Of course, when you finish tamping the mold is essentially filled, but if it is only half full, we have the gas flowing upward out of this, and the gas being heavier it would flow over the sides, and not directly up, and come down as quickly as possible. The percentage of air is dependent on where you take your sample. I think 99 out of 100 men that have seen this operation would go along with me, that at this lower point, which is the only point we are interested in, just above the surface of the snow, at this point, to reach this point the air could not flow down against the cold uprising carbon dioxide gas. This is correct (pointing to diagram), but it is a question of degree. [1077]

The Court: Mark that first little point "A" with a line to it, and the other one "B" just above the top of the snow.

The Witness: Shall I put "snow" down here?

The Court: And put "snow" down there.

Q. By Mr. Miketta: Am I correct, Mr. Martin—pardon me.

The Court: And put an arrow on the flow of gas around and down. Let that be the next exhibit illustrating the testimony of this witness.

Mr. L. S. Lyon: May I have this sketch which I produced and which the witness referred to in his testimony marked?

The Court: Let that also be combined with this and marked as one exhibit. The white one is the one produced by Mr. Lyon and about which he talked, and the

(Testimony of James W. Martin)

other one is the one that he made. Better mark one with the number and the other with an "A" following it.

The Clerk: This next number is 22.

[Note: Plaintiff's Exhibit No. 22 will be found in the Book of Exhibits at page 1354.]

[Note. Plaintiff's Exhibit No. 22a will be found in the Book of Exhibits at page 1355.]

The Court: Right.

Mr. Miketta: May I have that back as soon as you can?

The Court: That diagram, that little white one, was exactly the thing that was bothering me and I guess I am finally straightened out.

The Clerk: Is this in evidence, your Honor, or for identification?

The Court: No; in evidence to illustrate the testimony of this witness. [1078]

Q. By Mr. Miketta: As you have drawn there a partially filled mold on Exhibit 21, Mr. Martin, if snow forms a surface, let us say, halfway up that mold, then, if I understand your testimony correctly, gas is evolved from that snow and rises in that mold just as if you were pouring water into the mold and causing a surface or upper surface of a body of water to rise in that mold until it overflows over the sides, is that correct?

A. That is correct. Now, may I give you an illustration to show you? There is a shadow of incorrectness in it that I would like to—

(Testimony of James W. Martin)

Q. In the center of this there may be some eddies, is that correct?

A. There may be a question raised, as you are comparing a gas with liquid, one having a meniscus, we will say, at the surface, and the other not having such. May I give you an illustration to show what is, I think, in your mind and is certainly in mine?

Q. You may.

A. When you pack certain fruits and certain nuts, cashew nuts, to be more exact, which has been done, if you will put a little pellet of dry ice into the can, the dry ice melts or sublimates, the gas rises and purges out of this can all of the air that was contained in the can; so that in practice, in commercial practice, it is doing just what you say. I only offered this other because someone will raise that question [1079] of liquid, having a meniscus, is going to be different from gas which does not.

Mr. Miketta: That will be all.

\* \* \* \* \*

Mr. Foster: \* \* \*

Q. Mr. Martin, you have testified on your cross examination by Mr. Lyon with respect to the state of your recollection as to the date when operations were commenced at the plant at Sixth and East River, and your recollection of the dates when you had constructed and when you operated devices such as illustrated in Defendants' Exhibits L, O, and P. I wish to inquire about the state of your recollection as to the event of the commencement of the operations of the snow tank at the plant at Sixth and East River, as contrasted with the state of your recollection as to the date when such [1080]

(Testimony of James W. Martin)

operations commenced. What is the state of your recollection as to the event of the commencement of operations of the snow tank at Sixth and East River?

A. My recollections of the events at the Maspeth plant, in which we first made commercial dry ice, is very vivid. I spent all of my time there, long hours, I was intensely interested in what I was doing because it was, I thought, and positively think now—it was the first time that commercial dry ice was made and sold as an article of commerce. It was—well, every man has got a right to a little conceit. I was conceited to think that I was doing something first. It was that time, the events of that time that are vivid. If I were looking back on a lifetime, they would still be vivid, standing out. After the peak of production season, after the rush of events slowed down, I spent more and more time in the office, working on ways to use this product; out visiting customers, seeing their problems, seeking ways of using the product. I find it much more difficult to remember things that happened in this quiescent period—quiescent as far as the production is concerned—than I did back when we were in the heat of battle, if you will, for production.

Q. What is the state of your recollection, regardless of the date when operations commenced, operations of the snow tank at the plant at Sixth and East River, as to whether you had manufactured and did operate the devices illustrated in [1081] Defendants' Exhibits L. O., and P before or after the event of the commencement of the snow tank operations at the plant at Sixth and East River?

The Witness: May I have that question back so I am sure?



(Testimony of James W. Martin)

Mr. Foster: Yes.

(Question read by the reporter.)

Mr. L. S. Lyon: I would like to ask counsel, through your Honor, if he would identify the plant by using the term "Maspeth" or "General Carbonic" rather than "the plant at Sixth and East River," because I am afraid there is going to be some difficulty there.

Mr. Foster: I will be glad to, your Honor. I was referring by the plant described as "at Sixth and East River," to the General Carbonic plant.

Mr. L. S. Lyon: Well, I object to that on the ground that the witness has not testified to using the devices of Exhibit P at the General Carbonic plant at all.

Mr. Foster: My question does not contemplate that he had.

The Court: No; I did not think so. You may answer.

A. I am confident, beyond any shadow of a doubt, that we operated the devices as shown in Exhibit P and the Haynes type of press with a snow tank, Exhibit L—will you read me back my answer so far?

(Answer read by the reporter.)

A. —prior to the time that we commenced operation at the General Carbonic's plant at Sixth Street and East River. [1082]

Q. By Mr. Foster: In your cross examination by Mr. Lyon you stated that you were employed by Dry Ice Corporation on January 16, 1925 and your activities with relation to these devices illustrated in Defendants' Exhibits L, O, and P commenced very shortly thereafter. Have you in your possession any record relating to your employment at that time that was made during or near the close of that employment? A. I have.

(Testimony of James W. Martin)

Q. Would you produce that, please?

The Court: Before we go to that, Mr. Martin, in order to clarify me, did you intentionally omit O in the classification of the instrumentalities used prior to the operation at the Carbonic plant?

A. No, sir. I should have included O as one of the transition stages. It was unintentionally omitted.

Q. Then, the same statement is true as to the use of that instrument prior to the time that you moved over to the other plant?

A. That is true; yes, sir.

The Court: All right. Now, go ahead, Mr. Foster.

Mr. Foster: Thank you, your Honor.

Q. You have produced here a document dated in the first line of page 1 "November 30, 1928."

I have handed it to plaintiffs' counsel.

Mr. L. S. Lyon: If this is going to be used by the witness, I would like to have it marked for identification, [1083] as there are some parts of it that I will desire to call the court's attention to in argument.

The Court: Yes; have it marked for identification as Defendants' next in order.

The Clerk: Defendants' S.

The Court: S? A. S.

The Court: S for identification.

[Note: Defendants' Exhibit S will be found in the Book of Exhibits at page 1391.]

Q. By Mr. Foster: On page 13 of this agreement are some signatures, one purporting to be that of James Wellford Martin, Jr. Is that your signature?

A. That is my signature.

(Testimony of James W. Martin)

Q. Do you recognize any of the other signatures on that page?

A. The signature for the Dry Ice Corporation of America was Robert R. Rust, president; the signature for attest is E. Lawrence, E. R. Lawrence, who was secretary of the company; and I recognize the seal of the company there.

Q. When did you acquire this copy of this agreement dated November 30, 1928?

A. It was either on November 30th or on December 1st, of 1928.

Q. And where has it been since you first acquired possession of it?

A. It has been in my possession.

Q. Have any changes, additions, or alterations been made [1084] in it since it first came into your possession?

A. No. The only changes that were made were initialed at the time of signing.

Q. And by that last answer you are referring to such indicated changes and initials in the margin as appear on page 5?

A. That is correct.

Q. I note on page 4 reference is made to the time of Martin entering the employment of the predecessor of the company on the 16th day of January, 1925. Is this the document to which you referred as confirming your statement made on cross examination that you entered the employ of the Dry Ice Company on that date?

A. It is.

Mr. Foster: It is offered in evidence, your Honor, as Defendants' Exhibit S. [1085]

[Note: Defendants' Exhibit S will be found in the Book of Exhibits at page 1391.]

(Testimony of James W. Martin)

\* \* \* \* \*

The Court: There being no objection, the instrument will be received into evidence and marked as the defendants' next in order. Hand it back to Mr. Morris, if you will.

Q. By Mr. Foster. Your obligations expressed in the agreement, Exhibit S, you performed, Mr. Martin?

A. They were. I received letters saying that they had been.

Mr. Foster: Nothing else.

Mr. L. S. Lyon: I have no questions, Mr. Martin, thank you.

\* \* \* \* \*

Mr. Foster: Next, if the court please, I wish to introduce and read into the record certain of defendants' requests for admissions and the answers contained in plaintiffs' sworn statements in response thereto. And I will hand two copies of a summary of such requests and statements to the clerk and a copy to plaintiffs' counsel. But I believe that I can, during the progress of reading them into the record, eliminate the necessity for including all of them contained in the summary. First, "Defendants' request for admissions filed April 17, 1944, and plaintiffs' sworn statement in response thereto dated April 25, 1944."

No. 2. [1088]

\* \* \* \* \*

The Court: \* \* \*

In order to have this identified so that you may refer to it, let it be marked for identification, then hand it back to me.

The Clerk: Defendants' T.

Mr. Foster: First, is the Defendants' Exhibit T. Defendants' requests for admissions filed April 17, 1944, and plaintiffs' sworn statement in response thereto dated April 25, 1944.

No. 2. "'Compressed gas' refers to a substance which is normally gaseous and which has been compressed to a superatmospheric pressure but which is still in gaseous form."

Response to. "Plaintiffs admit the truth of the matters contained in paragraph 2 of defendants' Request for Admissions depending upon the context in which the term 'compressed gas' is used."

"3. 'Liquefied gas' refers to a substance, gaseous at ordinary temperature and pressure, which has been placed under temperature and pressure conditions capable of converting such gas into a liquid." [1089]

Response 3. "Plaintiffs admit the truth of the matters contained in Paragraph 3 of Defendants' Request for Admissions depending upon the context in which the term 'liquefied gas' is used."

"9. A 'compression chamber' may be a housing, receptacle, mold, cylinder, container or walled object in which a substance or material is subjected to pressure."

Response 9. "Plaintiffs admit the truth of the matters contained in Paragraph 9 of Defendants' Request for Admissions depending upon the context in which the term 'compression chamber' is used." [1090]

\* \* \* \* \*

Mr. Foster: Very well. I will offer request 13, appearing on page 3 of the summary.



"Prior to the earliest date of invention claimed by the plaintiffs for the subject matter of the patent in suit, there was known to others or disclosed in patents and printed publications the following fact, which fact is not the invention covered by, or asserted by Plaintiffs to be covered by, any of the claims of the patent in suit relied upon: That any suitable apparatus can be used in compressing carbon dioxide snow into blocks. (To facilitate plaintiffs' answers to Request 13, copies of the following patents are attached thereto, pertinent portions thereof being underlined in red and figure legends similarly identified:

Elworthy	579,866
Slate	1,546,681
Martin	1,659,435

British:

Elworthy 7,436 of 1895)."

Third sentence omitted from the request.

Response to requests 12 to 16, reading 12 to 16, inclusive, of defendants' requests for admissions as at the [1092] dates appearing thereon:

"Plaintiffs admit the application for and the grant of the Letters Patent referred to in Paragraphs 12 to 16, inclusive, of defendants' Request for Admissions as of the dates appearing thereon. Plaintiffs deny that any matters set forth in any of said patents or publications having an effective date earlier than the effective date of the claims here in issue, describes or anticipates the invention of the claims here in issue." [1093]

Mr. Foster: No, sir; not until 17, on page 9, if the court please.

"17. It has been heretofore determined by the United States Patent Office, after proceedings involving the application for the patent in suit, duly had, and hearings held, by a decision which has become final, that Harry W. Cole and Malcolm W. McLaren did not invent the following combination and that the patent in suit does not cover the following combination:

"(1) An expansion chamber;"— [1094]

Mr. L. S. Lyon: May I ask what we are reading now, your Honor?

Mr. Foster: Request 17, page 9, Mr. Lyon.

\* \* \* \* \*

Mr. Foster \* \* \*

Continuing at the top of page 10 as to this combination, we find in the requests that was not, according to the requests, the invention of Cole and McLaren.

"(1) An expansion chamber;

"(2) A compression chamber in gas-light communication with the expansion chamber;

"(3) Rotary scrapers in the expansion chamber above said communication; [1095]

"(4) Means for expanding liquefied gas to produce an accumulation of solidified gas in the compression chamber;

"(5) Means including a plunger arranged to close communication between said chambers and to compress the solidified gas.

“(In order to facilitate Plaintiffs’ answer hereto, attention is specifically called to Count 7 of Interference No. 59,938 and the decision of the Examiner of Interferences awarding priority to Gustave T. Reich, the decision being dated October 12, 1935.)”

In response to request 17, the first sentence omitted.

“17. The Reich application referred to in defendants’ request No. 17 was abandoned, but prior to the abandonment of said application priority of invention in Interference No. 59,938 was awarded to Gustave T. Reich over Harry W. Cole and Malcolm W. McLaren for a count reading as follows:

“‘A refrigerating apparatus, comprising an expansion chamber, a compression chamber below and in gas-tight communication with the expansion chamber, rotary scrapers in the expansion chamber above said communication, means for expanding liquefied gas to produce an accumulation of solidified gas in the compression chamber, and means, including a plunger, arranged to close communication between said chambers and to compress the solidified gas.’” [1096]

\* \* \* \* \*

The Court: Let the objection be registered, and the court will withhold its opinion until later. You may proceed. [1109]

\* \* \* \* \*

Mr. Foster: 18. “It has been heretofore determined by the United States Patent Office, after proceedings involving the application for the patent in suit duly had and hearings held, by a decision which has become final, that Harry W. Cole and Malcolm W. McLaren did not invent

the following combination and that the patent in suit does not cover the following combinations:

- (1) An expansion chamber;
- (2) A compression chamber below and in gas-tight communication with the expansion chamber;
- (3) Rotary scrapers in the expansion chamber [1110] above said communication;
- (4) Means for expanding liquefied gas to produce an accumulation of solidified gas in the compression chamber;
- (5) Means including a plunger, arranged to close communication between said chambers and to compress the solidified gas;
- (6) A movable closure against which the solidified gas is compressed.

(In order to facilitate Plaintiffs' answer hereto, attention is specifically called to Count 8 of Interference No. 59,938, priority as to such count being awarded to Gustave T. Reich by the Examiner of Interferences on October 12, 1935.)"

Mr. L. S. Lyon: May I ask your Honor, when you are reflecting on this matter in your chambers, to reflect on this question. It seems to me it is a hideous question.

The Court: I have already reflected on it.

Mr. Foster: Will your Honor reflect also on the fact that the plaintiffs experienced no difficulty in presenting the answer I will read.

Mr. L. S. Lyon: If you will read the entire answer you will find we did have some difficulty.

Mr. Foster: I will skip the first sentence.

"18. . . . The Reich application referred to in defendants' request No. 18 was [1111] abandoned, but prior to the abandonment of said application priority of invention in Interference No. 59,938 was awarded to Gustave T. Reich over Harry W. Cole and Malcolm W. McLaren for a count reading as follows:

" 'A refrigerating apparatus comprising an expansion chamber, a compression chamber below and in gas-tight communication with the expansion chamber, rotary scrapers in the expansion chamber above said communication, means for expanding liquefied gas to produce an accumulation of solidified gas in the compression chamber, means, including a plunger, arranged to close communication between said chambers and to compress the solidified gas, and a movable closure against which the solidified gas is compressed.' "

Mr. L. S. Lyon: May I ask your Honor if now is the time for us to ask for the remainder of the reply to be received which has been omitted by counsel? If the part offered is to be received, or should we wait until a later time?

The Court: Wait until a later time, but if you want to [1112] object on the same ground you should do so.

Mr. L. S. Lyon: I want to make the same objection as I made to 17.

The Court: The objection will be understood as being made, and the matter will stand submitted.

Mr. Foster: 19. "It has been heretofore determined by the United States Patent Office, after proceedings involving the application for the patent in suit duly had



and hearings held, by a decision which has become final, that Harry W. Cole and Malcolm W. McLaren did not invent the following combination and that the patent in suit does not cover the following combination:

- (1) A compression chamber;
- (2) Means for expanding a liquefied gas to form an accumulation of solidified gas in said chamber;
- (3) A plunger for compressing the material in said chamber;
- (4) A conduit at the end of the chamber opposite to the plunger for withdrawing gas from the chamber.

(In order to facilitate Plaintiffs' answer hereto, attention is specifically *call* to Count 2 of Interference No. 62,902 and the decision of the Examiner of Interferences awarding priority to Gustave T. Reich, the decision being dated May 9, 1932.)" [1113]

And the response to 19, the first sentence omitted:

19. ". . . The Reich application referred to in defendants' Request No. 19 was abandoned, but prior to the abandonment of said application priority of invention in Interference No. 62,902 was awarded to Gustave T. Reich over Harry W. Cole and Malcolm W. McLaren for a count reading as follows:

" 'A gas solidifying apparatus comprising a compression chamber, means for expanding a liquefied gas to form an accumulation of solidified gas in said chamber, a plunger for compressing the material in said chamber, and a conduit at the end of the chamber opposite to the plunger for withdrawing gas from the chamber.' "

Mr. L. S. Lyon: Same objection.

The Court: Same ruling.

Mr. Foster: And Request 20:

"It has been heretofore determined by the United States Patent Office, after proceedings involving the application for the patent in suit duly had and hearings held, by a decision which has become final, that Harry W. Cole and Malcolm W. McLaren did not invent the following [1114] combination and the patent in suit does not cover the following combination:

- (1) Means for forming a liquefied gas into solid particles;
- (2) Means for compacting the particles into a solid mass;
- (3) Means for supplying gas under pressure to the compression means to operate it.

(In order to facilitate Plaintiffs' answer hereto, attention is specifically called to Count 3 of Interference No. 59,938 and the decision of the Examiner of Interferences awarding priority to Gustave T. Reich, the decision being dated October 12, 1935.)"

The response to 20, the first sentence omitted:

". . . The Reich application referred to in defendants' Request No. 20 was abandoned, but prior to the abandonment of said application priority of invention in Interference No. 59,938 was awarded to Gustave T. Reich over Harry W. Cole and Malcolm W. McLaren for a count reading as follows:

" 'In a system of the type described the combination with means for forming a liquefied gas into solid particles, and means for compacting the particles [1115] into a solid

mass, of means for supplying gas under pressure from said system to said compressing means to operate it.' ”

Mr. L. S. Lyon: The same objection.

The Court: It may be registered. The same ruling.

Mr. Foster: Request 21:

“Plunger 61, described and shown in the patent in suit, is movable in the compression chamber 60, which is in gas-tight communication with the snow chamber 50.”

And the response:

“Plaintiffs admit the truth of the matters contained in Paragraph 21 of defendants’ Request for Admissions.”

Request 22:

“Means 16 and 90 are described in the patent in suit for supplying gas under pressure to the means which operate means for compacting carbon dioxide snow into a solid mass.”

Mr. L. S. Lyon: I think these are improper, your Honor, but they are harmless. I am not going to ask your Honor to struggle with these, but I would like it understood that in not objecting to the latter, even though they can be objected to on the same ground as 17 to 20, we are not conceding 17 to 20 are proper.

Mr. Foster: The response to 22:

“Plaintiffs admit the truth of the mat- [1116] ters contained in Paragraph 22 of defendants’ Request for Admissions.”

Next, omitting Request 23.

Request 24:

“The valve 39, shown in Fig. 1 of the patent in suit, controls the introduction of liquid gas into the so-called

snow-forming and pressing chambers, and, as shown and described in the patent in suit, such valve 39 is opened and closed by the motion of the pressing plunger."

And the response to 24:

"Plaintiffs admit the truth of the matters contained in Paragraph 24 of defendants' Request for Admissions."

Mr. L. S. Lyon: I understand that 23 is not offered?

Mr. Foster: I so stated, Mr. Lyon. [1117]

Omitting request 25. Request 26:

"The patent in suit, No. 2,025,698, does not state or describe what is 'a definite pressure':

"(1) By way of example;

"(2) In figures;

"(3) In terms of pounds, atmospheres, inches of mercury;

"(4) In words."

The response, part of sentence omitted: "\* \* \* hence the term 'a definite pressure' is not defined or described by way of example, in figures, in terms of pounds, atmospheres, inches of mercury, or in words."

Mr. L. S. Lyon: I object to that as fragmentary, and not coming within your Honor's rule that admissions as such may be received as a separate part of a document or separate part of an answer. This is part of a sentence, and apart from the rest of the sentence, the context cannot be known to your Honor.

The Court: I think that is true. I will ask counsel to read in enough of that answer so that I can really see what it is.

Mr. Foster: We urge that is the part that is relevant.

The Court: I will ask you to read the entire answer.

Mr. Foster: I will read the entire answer.

“The defendants’ request No. 26 cannot be either truthfully admitted or denied categorically, for the implications of such admission or denial would be contrary to the fact in [118] that ‘a definite pressure’ is to be read in the light of the specification of the patent in suit and the prior art and need no definition by way of example, in figures, in the terms of pounds, atmospheres, inches of mercury, or in words, and hence the term ‘a definite pressure’ is not defined or described by way of example, in figures, in terms of pounds, atmospheres, inches of mercury, or in words.” [1118-A]

The Court: The whole answer will be admitted at this time.

Mr. Foster: May the defendants have an objection of record to the addition of the first part of that answer, as non-responsive to the request?

The Court: Yes. It may be argumentative, but I think that it is like taking a part out of a particular matter; it is difficult to separate it. The answer is argumentative, but those four lines, standing alone, do not mean just what they may possibly mean when they are taken in their context. Therefore, I have asked to have the whole thing. Proceed. [1119]

\* \* \* \* \*

Mr. L. S. Lyon: That is correct.

Mr. Foster: Request 31: “Application for United States Letters patent Serial No. 152,754, for Improvement in Carbon Dioxide Ice Apparatus, Process and Product,



naming James W. Martin, Jr. of Yonkers, Westchester County, New York:

- “(1) Was filed in the United States Patent Office December 6, 1926;
- “(2) Was assigned during its pendency in the United States Patent Office to Dryice Corporation of America;
- “(3) Was thereafter, and during its pendency in the United States Patent Office, assigned to Adico Development Corporation; [1126]
- “(4) Became abandoned by failure of the owner of said application to file a response to the Patent Office action of November 19, 1935, although claims were allowed in said application.”

Response to 31: “Plaintiffs admit the truth of the matters contained in Paragraph 31 of defendants’ Request for Admissions.”

Mr. L. S. Lyon: That is objected to on the ground it is incompetent; and I call your Honor’s attention to the fact that a certified copy of that application has already been offered in evidence by the defendants.

Mr. Foster: The certified copy does not, I think, contain all sought by this request and admitted by the plaintiffs. It does not include the formal assignments.

Mr. Miketta: May I call your Honor’s attention to the fact that in the last two answers, 30 and 31, the plaintiffs did not reserve any objections whatsoever. And I am just wondering whether it is proper at this late time to consider objections which were not even reserved in their answers.

The Court: I am going to reserve a ruling on this also, to be sure.

Mr. Foster: Request 33. "Neither of the Plaintiffs nor any predecessor of either of them ever gave notice to any of the Defendants or any of the predecessors of the Defendants employing any of the devices, the use of which is complained of herein, that such use was an infringement of the patent in [1127] suit until after October 1, 1941."

Response to the second and third paragraphs omitted.

"Plaintiffs admit that neither of the plaintiffs nor any predecessor of either of the plaintiffs ever gave notice to any of the defendants that the use of the accused apparatus was an infringement of the patent in suit until after October 1, 1941."

The Court: We will adjourn until 2:00 o'clock.

(Whereupon a recess was taken until 2:00 o'clock p. m. of the same day.) [1128]

## AFTERNOON SESSION

2:00 O'CLOCK

The Court: Proceed.

Mr. Miketta: May the court please, at this time I would like to introduce into the record certain of defendants' requests for admissions, filed August 17, 1942, and plaintiffs' admissions in response thereto, filed September 8, 1942. And, with your Honor's permission, these are guilty of being written on short paper and we would like to have the opportunity of rewriting them.

The Court: Let them be marked for identification the next number.

The Clerk: Defendants' U. [1129]

\* \* \* \* \*

Mr. Miketta: Request 31: "That prior to May, 1928, it was known that when liquid carbon dioxide is admitted into a chamber a part of the liquid is converted into carbon dioxide snow, as evidenced by statements appearing in Slate patent No. 1,546,682." [1157]

"(31) Plaintiffs admit, in response to defendants' request for admission No. 31, that prior to May, 1928, it was known that carbon dioxide snow could be made under the conditions set forth in Slate Patent No. 1,546,682 which issued July 21, 1925; but plaintiffs deny that liquid carbon dioxide is converted into carbon dioxide snow under all conditions when liquid carbon dioxide is admitted into a chamber."

Request 32:

"That the operation of the Slate apparatus described and illustrated in patent No. 1,546,682, includes the steps of: introducing liquid carbon dioxide into the cylinder 22, converting a portion of the liquefied carbon dioxide gas into a solid and a portion thereof into a gas by expansion; accumulating a mass of the solidified gas in the cylinder, and withdrawing the unsolidified gas from the cylinder through outlet 28."

Admits 32:

"Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial."

In order to shorten this, your Honor, we can eliminate from consideration Request 33. [1158]

34: "That the operation of the Slate apparatus described and illustrated in patent No. 1,546,682, includes the steps of: introducing liquid carbon dioxide into the cylinder 22, converting a portion of the liquefied carbon

dioxide gas into a solid and a portion thereof into a gas by expansion; accumulating a mass of the solidified gas in the cylinder, withdrawing the unsolidified gas from the cylinder through outlet 28, and shutting off the supply of liquefied carbon dioxide gas to the cylinder by operating valve 5' after a desired mass of solid carbon dioxide has been accumulated in the cylinder 22."

There is an answer that covers 34 to 41.

Admit, subject to all pertinent objections to admissibility which may be interposed at the trial.

Request 35:

"That the Slate patent No. 1,546,682 shows a cylinder 22 provided with an inlet pipe 24 through which liquid carbon dioxide may be supplied to the cylinder, and an outlet 28 for gas in communication with the cylinder."

Admits (34) to (41)

"Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial."

Request 37:

"That, as shown and described in Slate patent No. [1159] 1,546,682, unsolidified gas is discharged from a snow chamber 22 and is led by line 28 into counter-current, heat exchange relation with liquefied gas, which liquefied gas is then passed by line 26 into the snow chamber, the exchanger being indicated at 30."

Admits (34) to (41).

"Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial."

Request 38:

"That, as shown in Fig. 1 of patent No. 2,025,692 and described in said patent, unsolidified gas is discharged from a snow chamber and is led by line 80 into countercurrent, heat exchange relation with liquefied gas in heat exchanger 40, liquefied gas from such heat exchanger being then passed by line 38 into the snow chamber."

Admits (34) - (41).

"Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial."

Mr. L. S. Lyon: I have no objections to make down to 52 in this memorandum, and, if satisfactory, they can be copied into the record as read, without actually reading them. I don't see how your Honor can be getting anything out of this reading, because you haven't got the Slate [1160] patent, and nobody has explained it to you.

The Court: That's right.

Mr. Miketta: In these various requests, your Honor, we show a long list of prior patents, and some of them, at least, show that the same construction as this claimed in the patent in suit also appeared in these prior patents.

The Court: Let us just consider those are all read into the record down to including 51.

"39. That in Figs. 1 and 2 of patent No. 2,025,698 a chamber is shown at 50, means for supplying a liquefied gas to said chamber to convert a portion of the liquefied gas into a solid and a portion into a gas are indicated by line 38 and nozzles 51, and a conduit for withdrawing gas from the chamber is indicated at 80.



“(34) – (41). Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial.

“40. That in patent No. 2,025,698 chamber 50 is identified as a snow chamber in which liquefied gas is expanded and a portion of such liquefied gas is converted into a solid while a portion thereof is unsolidified and is withdrawn through line 80.

“(34) – (41). Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial. [1161]

“41. In patent No. 2,025,698 chamber 60 is identified as a compression chamber.

“(34) – (41). Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial.

“42. With particular reference to Fig. 5 of patent No. 2,025,698, the chamber 100 is provided with a loose-fitting piston 103 so that gas may pass past the piston and through openings 101 into jacket 102, the lower portion of the jacket, illustrated in Fig. 5, showing a port communicating the jacket with the atmosphere.

“(42). In response to defendants’ request for admission No. 42, plaintiffs admit that chamber 100 illustrated in Fig. 5 of Patent No. 2,025,698 is provided with a loosely fitting piston 103 so that gas may pass past the piston and through openings 101 into jacket 102. Plaintiffs deny that the lower portion of the jacket 102 illustrated in Fig. 5 shows a port communicating the jacket with the atmosphere. On the contrary, the patent discloses that the port is connected with pipe 80.

"43. That the Martin patent No. 1,659,435 shows a chamber [1162] 10 provided with an inlet pipe 16, a nozzle 17 through which liquid carbon dioxide may be supplied to the chamber, and an outlet for gas including the screen 23, a space around the chamber 10 and conduit 11.

"(43) - (47). Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial.

"4. That in the operation of the apparatus described and illustrated in patent No. 1,546,682 the volume of cylinder 22 is maintained constant while liquefied gas is expanded in such cylinder.

"(43) - (47). Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial.

"45. That in the operation of the apparatus described and illustrated in patent No. 1,659,435 the volume of the metal casing delineating chamber 10 is maintained constant while liquefied gas is expanded in such chamber.

"(43) - (47). Admitted, subject to all pertinent objections, to admissibility which may be interposed at the trial.

"47. Prior to May, 1926, it was known that carbon dioxide snow could be compressed into dense cakes and in this connection plaintiffs' attention is called to the following: [1163]

"'The carbon dioxide snow, as it thus comes from the refrigerating chamber, is porous and light, but is then compressed by any suitable apparatus into dense cakes of any convenient size to fit the requirements of the trade.'

(Slate patent No. 1,546,681, issued July 21, 1925, page 1, lines 104-109).

“(43) – (47). Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial.

“48. That prior to May, 1928, the use of hydraulic means or pistons operated hydraulically to hold and move a breech block of a machine for the manufacture of solid carbon dioxide was known to persons other than Harry W. Cole and Malcolm W. McLaren as evidenced by matters published February 14, 1928 in patent No. 1,659,431 to Walter S. Josephson, including page 3, lines 24-33 thereof.

“(48). Plaintiffs deny defendants’ request for admission No. 48 but plaintiffs admit that patent to Josephson No. 1,659,431, page 3, lines 24-36 inclusive, states:

“‘It will be evident that while I have shown one apparatus whereby my method may be practiced, the desired [1164] constant or follow-up pressure may be applied in other ways, as, for instance, by pistons forced downward upon the liquid in the ice chambers 41 after the chamber has been filled and cut off; the removable breech blocks may be held in any desired way as, for instance, by hydraulic pressure; and the freezing refrigerant may be supplied by any suitable refrigerating machine instead of by the expanded nitrogen product as above described.’

“50. In patent No. 1,631,037 there is shown an apparatus including a chamber 4 having walls da, a compressing plunger 3 carried by ram 2, the plunger 2 operating within the chamber 4, and a hydraulically operated head 12 upon ram 11 adapted to close the end of chamber 4 and against which material may be compressed by the plunger 3.

“(50). Plaintiffs admit that in Patent No. 1,631,037 there is shown an apparatus (‘for dehydrating masses of boiled garbage, packing house tankage, or other matter of similar nature’), including a chamber 4 having walls 4a, a compressing plunger 3 carried by ram [1165] 2, the plunger 3 operating within the chamber 4, and a hydraulically operated head 12 upon ram 11 adapted to close the end of chamber 4 and against which material may be compressed by the plunger 3.

“51. In patent No. 1,631,037, and particularly Figs. 1 and 2 thereof, an apparatus is described including means for permitting the withdrawal of fluid from chamber 4, such means including openings 30, 31, 33 and pipe 34.

“(51). Admitted, subject to all pertinent objections to admissibility which may be interposed at the trial.”

(Short recess.)

Mr. Miketta: The next request is 53.

The Court: You skip 52?

Mr. Miketta: Yes.

Request 53:

“53. That Plaintiff INTERNATIONAL CARBONIC, INC. has acquired the exclusive right to issue licenses under at least forty patents pertaining to various modifications in methods of making solid carbon dioxide and apparatus for use in the manufacture of solid carbon dioxide, and has offered licenses thereunder to manufacturers of solid carbon dioxide, such [1166] licenses providing, among other conditions—

(a)—that the licensee pay plaintiff a royalty on each pound of solid carbon dioxide made by the licensee,

(b)—that such royalty be paid whether or not solid carbon dioxide made by the licensee is manufactured in accordance with the methods and apparatus of any one of the licensed patents.”

Admission 53:

“(53). Plaintiffs deny defendant’s request for admission No. 53 but plaintiffs admit that they have offered to manufacturers of solid carbon dioxide licenses in the form of Exhibit 2 (with the exception of the written notations thereon) annexed to defendant’s request for admissions. . . .

The last sentence is omitted.

Mr. Foster: I will state, for the information of the court, that Exhibit 9, which is not attached, was attached to the original requests, and does contain such a provision to indicate the reason for the conclusion therein made, which, with the court’s permission, we will withdraw from the exhibits, from the original requests, and attach it to the summary, so it is complete.

The Court: Yes, if you put it in the final form.  
[1167]

\* \* \* \* \*

Mr. Miketta: Request 61. “That Exhibit 9, appended [1185] hereto, is a true copy of the license which was offered to defendant by plaintiffs.”

The Court: Now we are getting down to the meat of the cocoanut. It is like taking two or three hours to argue the question, and then finally the witness says no.

Mr. Miketta: 61: “Plaintiffs admit that Exhibit 9 (but without the written matter thereon), appended to defendant’s request for admission, is a true copy of the license which was offered to defendant by plaintiffs.”



And I ask leave to have that appended to the summary, your Honor.

The Court: Yes. [1186]

\* \* \* \* \*

Mr. Miketta: \* \* \*

Request 66: "That the conversion of a part of a liquefied gas into a solid and a part thereof into a gas by permitting a liquefied gas to expand in a chamber, is a natural, inherent function of the liquefied gas."

Their admission, "(first and third sentences omitted)."

\* \* \* "Plaintiffs are informed that not all gases that may be liquefied may be solidified. \* \* \*" [1187]

\* \* \* \* \*

Mr. Miketta: May the court please, we find from reading the record that, although Request 53 and the Admission thereto were admitted and introduced in evidence, the Exhibit 9 of that Request which constitutes the license agreement form was not marked into evidence and was not introduced into [1192] evidence. May I offer that exhibit into evidence at this time?

The Court: Yes, I think it was understood that it was to go along, but was not actually taken care of.

Mr. Miketta: May it be marked DD?

The Court: Yes.

[Note: Defendants' Exhibit DD will be found in the Book of Exhibits at page 1413.]

Mr. Foster: At this time, if the court please. I would like to have marked for identification as Defendants' Exhibit EE the prior art patents that have heretofore been filed, and are in the tab book; not all of those patents

being included in the offer, the offer being limited to Cartier, 338,034, tab 1,—

Mr. L. S. Lyon: May this be a little slower?

Mr. Foster: I will withdraw that offer, and first offer and ask to have marked for identification as Defendants' Exhibit FF, this chart, which contains a list of the patents I propose to read. I think it will facilitate the matter for Mr. Lyon.

The Court: You may use that to make this offer.

Mr. Foster: I will give one copy to the court. I have delivered a copy to the defendants' counsel. If it will be of any help to counsel I can give them another copy.

The Court: Do you want to put in each one of these patents separately, under a separate letter, for easy reference?

Mr. Foster: Yes. [1193]

The Court: I think you had better, because you may want to refer to them, not only for the purpose of this proceeding, but on appeal.

Mr. Foster: It would be easier for the court, if I give a letter or number? This is FF.

The Court: That is all right. Just make a notation of what it is, in the record.

Mr. Foster: I offer this as Exhibit EE for identification.

[Note: Defendants' Exhibit EE will be found in the Book of Exhibits at page 1420.]

Cartier	338,034	EE-1;
Sailor	467,783	EE-2;
Holden	530,526	EE-3;
Drummond	533,871	EE-4;
Gaylord	760,191	EE-5;
Holden	876,352	EE-6.

The Court: Let me suggest that you make your number correspond with the number here. It will be EE-1, Cartier; EE-2, Sailor; EE-3, Holden. Follow these same numbers, if you will. Go over this again, so we will have them right.

Mr. Foster: I think down to and including Drummond, EE-4, they are identical.

The Court: Yes.

Mr. Foster: Gaylord 760,191 EE-6, Holden, which is 876,352, will be EE-7; Fleming, which is 955,454, will be EE-8; Julius. 1,018,568, is EE-9; Holden, 1,054,772, EE-10; Osborne, 1,104,920, EE-11; Stastney, 1,288,255, EE-12: [1194]

Slate	1,546,681	EE-15;
Slate	1,546,682	EE-16;
Kochenderfer	1,631,037	EE-17;
Slate	1,643,590	EE-18;
Josephson	1,659,431	EE-19;
Martin	1,659,434	EE-20;
Martin	1,659,435	EE-21;
Voightlander	1,726,373	EE-22;
Martin	1,887,692	EE-24;

British:

Tichborne et al	13,684	EE-26;
Elworthy	7,436	EE-27;
Slate, British	237,681	EE-28;

Haynes, British 263,922, is already in evidence as Defendants' Exhibit M, your Honor; and with the court's permission to list them all, I will give it the list number on the list as No. 31, to avoid any duplication of numbers with the index list.

The Court:    Yes.

Mr. Foster:    The last patent is Cole and McLaren, patent in suit.

The Court:    I think No. 24 was also introduced in evidence as Plaintiffs' Exhibit 21, but it doesn't make any difference, as long as the record shows it is the same patent. It will be convenient to have them in this way.

Mr. Foster:    I will hand the original file of these [1195] patents, with the index, to the clerk.

Mr. L. S. Lyon: It isn't clear to me in regard to the Haynes British patent. What number has been assigned to that?

Mr. Foster:    31, for the reason that the index is complete with 30.

Mr. L. S. Lyon: That is Exhibit M, also Exhibit 31?

The Court:    No, 28 is Exhibit M.

Mr. Foster:    The British Haynes patent, No. 31, I believe, your Honor, is Defendants' Exhibit M.

The Court:    Slate takes the 28 number?

Mr. Foster:    Yes, the British Slate.

The Court:    Heseling was not introduced?

Mr. Foster:    No.

The Court:    Cole and McLaren 32?

Mr. Foster:    Yes. We can mark that 32.

The Court:    Mark it 32. That may be received.

Mr. Foster:    I think I offered them for identification. I offer them in evidence. They are covered by stipulation.

The Court:    They may be received in evidence, and so marked. [1196]

WILLIAM HOWARD CLAPP,

a witness called by and on behalf of the Defendants,  
having been first duly sworn, testified as follows:

The Clerk: Please state your name.

A. William Howard Clapp.

Direct Examination

Q. By Mr. Foster: Will you tell us your residence, Professor Clapp?

A. At 95 South Mentor Avenue, Pasadena.

Q. Will you tell the court your experience and education in technical matters?

A. As a young man I served an apprenticeship course with the Penfield Clay Machinery Company at Willoughby, Ohio, as a mechanic. This was one of the pioneer companies manufacturing brick and tile-making machinery, and their plant included a variety of presses, some massive. I did the work of fabricating, erecting and testing of those presses. In 1901 I graduated from the University of Minnesota, in engineering, and my subsequent work led into the design of milling machinery and layout of milling plants and their direction, and in the formation of a company in Salt Lake City, of which I was the designing engineer, in which we manufactured equipment, and designed plants in which I did the designing and supervised the direction and starting of those plants, in Utah, Colorado, Idaho, Montana—

The Court: Flour mills? [1197]

A. No, ore mills. Also in Nevada. I entered the employ of the Throop Polytechnic Institute, during the years 1911 and 1912 as instructor in mechanical engineering. I became a full professor in 1918, and professor emeritus on July of last year.



(Testimony of William Howard Clapp)

Q. By Mr. Foster: The Throop Technical Institute became the California Institute of Technology shortly after you became associated with it in 1912, is that correct?

A. Yes. My work in that connection consisted in teaching courses in machine design, materials and processes, and graduate courses in advanced strength of material.

The Court: S. and R.?

A. I am a member of the American Society of Mechanical Engineers, the American Association of University Professors; American Association for the Advancement of Science; and of the honorary societies of Sigma Psi and Tau Beta Pi; past president of the Los Angeles section of the American Society of Mechanical Engineers; Pasadena Engineering Society, and of the Los Angeles Engineering Council.

Q. By Mr. Foster: Are you the Professor Clapp who with Dr. Donald S. Clark, wrote a textbook on materials and processes?

A. I am. This was brought out about five years ago, and is now in its eighth printing.

Q. Is that a textbook used in colleges, universities, and naval and military schools in the United States?

A. Yes, it has been used at West Point and Annapolis, and [1198] in most of the engineering schools.

Q. In the course of your long experience, Professor, have you had occasion to study and become familiar with the contents of patents? A. I have.

Q. Have you read, and are you familiar with the contents of the patent in suit, 2,025,698?

A. I have.

(Testimony of William Howard Clapp)

Q. Will you refer to that patent, and explain to the court what is there disclosed?

A. This is a patent referring to a gas solidifying apparatus. Referring to Fig. 1—

Q. In that connection, Mr. Clapp, perhaps you can point out upon this enlargement, Fig. 1 of the patent in suit, which is Plaintiffs' Exhibit 8, the elements to which you refer.

A. Referring to Fig. 1, the gas from any suitable source enters the system through the exhaustor 11. There is a storage tank, or gas holder, which is described as the usual inverted bell type. The exhaustor is described as a motor-driven positive type, and there is also a connection from the exhaustor to the compressor 15, in which the gas is compressed to around 1500 pounds per square inch, and enters the system. The entire layout, the tanks, and so forth, is diagrammatic and cursory. There is an oil separator 21, where some of the oil is taken out. There is a water cooled condenser— [119]

The Court: That is, the impurities in the gas?

A. Yes; oil might enter the system through the condenser. There is a compressor system through which gas passes through coils 23 and is cooled in a tank of water or liquid, as the patent states.

Q. By Mr. Foster: 23 or 25?

A. 25. The gas then passes into a tank 30, containing carbonaceous matter, 31, through which it rises. The liquid, I should say; it is supposed to be liquid, and any water condensing being removed at the tap 35, while air, and other non-liquefied gases are collected at 36, and may be let out through the valve 37. From this tank the liquid CO<sub>2</sub> passes down through the pipe 38 or may

(Testimony of William Howard Clapp)

be by-passed through a countercurrent heat exchanger in which the gases are further cooled by outflowing gases from the snow tank.

Q. By the Court: That is an optional arrangement with the operator?

A. That is an optional arrangement with valves shown, not numbered, by which it can be passed either way. And the gases then pass down through an automatic valve 39 and are shown as entering the snow chamber at 51 on either side of the snow chamber.

Q. Is this heat exchanger—

A. It is entirely diagrammatic. It would probably consist in the use of the gas to cool a brine or some liquid of that sort which would flow around, as gas is a very poor [1200] conductor leading to another gas. This automatic valve is shown to be operated through a lever

(97)

mechanism, through the rod 79 which is actuated by a piston.

Mr. Foster: Pardon me, Professor, 79 or 97?

A. 97, which is actuated by a crank, or which is actuated by a connection to the piston 63, which will be described hereafter. The outflowing gases from the tank exit through the pipe 80 and, as shown, they either go into the countercurrent heat exchanger or may go directly to an exhauster which is described as motor-driven, positive type, that is, 11 is so described, and then into a storage tank called an expansion tank, and from there on back to the gas holder or compressor.

Q. Pause there just a moment, Professor. With reference to Fig. 2 of the patent do the gases escaping

(Testimony of William Howard Clapp)

from the snow chamber 50 before they enter the pipe 80 circulate in any manner around?

A. Yes. I was just coming to a description of the snow chamber.

Q. I see.

A. Referring to Fig. 2, the snow chamber is represented by No. 50 and is described on page 1, lines 39 to 40, second column, as having parallel sides and curved ends, as shown in Fig. 3 in plan. It is a double-walled chamber, jacketed, with the inlet to the gases as shown at 51 and shown in sealed communication with the pressing chamber 60. [1201]

There is also a reference, page 2, lines 41 to 44, which I have covered except that there is also shown a geared device for stirring in the chamber or loosening the material so as to help it flow out of the outlet at the bottom into the pressing chamber of 60.

At the right, in Fig. 2 and in Fig. 3, there is shown a closure head 70, described on page 1, lines 52 to 53, second column of the patent, and there is shown also a hydraulic cylinder 71, containing a piston 72, with a piston rod 73 which actuates this head to press it into close engagement with the pressing chamber 60. A description of this hydraulic cylinder is given, page 2, 25 to 29, first column; page 2, 43 to 47, second column.

The ports of this cylinder are connected, as shown in Fig. 1, through pipes 74 and 76 with cylinders 75 and 77 which the patent describes as containing water or glycerine or oil. The upper ends of these cylinders 75 and 77 each have two pipe connections, valve-controlled, one of these connections with the low-pressure system through pipe 91 which goes back to the expansion tank,

(Testimony of William Howard Clapp)

and the other one with the high-pressure carbon dioxide system, through pipe 90 which connects between the compressor and the oil separator. By the actuation of those valves liquid may be caused to flow into cylinder 71 and to actuate the closure head 70 either to bring it into engagement or to remove it from engagement. Likewise on the left of the diagram there is shown a [1202] compressing piston 61 having a rod 64 connecting with a piston 63 in cylinder 62, and this piston is actuated by fluid in entering through pipes 65 or 67 from the chamber 66 and 68 which contain a suitable fluid for making engagement when brought into connection with the outlets, as shown, of each cylinder to the high-pressure side of the gas system or to the low-pressure side of the system.

It will be seen that in the present position the piston 61 is retracted, the connection between the snow chamber and the pressing chamber is unobstructed. References to the pressing cylinder and actuating cylinders are given on page 2, lines 20 to 24, first column; page 2, lines 54 to 57, first column; and for actuation, page 2, lines 20 to 24, the piston being actuated by valve pressure or hydraulically.

References to the inlet on page 2, 25 to 29, where the liquid CO<sub>2</sub> is shown entering by a nozzle, 25 to 29—I beg your pardon. I misspoke.

References to the inlet are on page 1, 39 to 42, second column: "The purified liquefied gas is then led to the chamber 50 into which it is discharged through nozzles 51, its flow being controlled by an automatic valve 39."

And the discharge of the gases is described on page 1, 53 to 55, right-hand column. It says: "The unfrozen



(Testimony of William Howard Clapp)

gas escapes from chamber 50 through orifices 52 into a jacket 53, from which it is led by a pipe 80 to a circulating exhauster 81." [1203]

Some comments might be pertinent here. The exhauster—

Q. You are referring now to Fig. 1, are you?

A. Fig. 1.

Q. Thank you.

A. The exhauster 11 is described as motor-driven, positive type, of which the Root's blower is standard equipment. These run most efficiently at less than five pounds per square inch and seldom exceed that pressure. The gasholder, which is described as the usual inverted bell type, is generally operated at pound or less per square inch, it having a water seal and no great difference in head between the water in the inner and outer tanks, the inner tank which contains the gas usually being counter-balanced. There are no valves in the line 83 between the gas holder and the exhauster 81. I see no possibility of pressures being built up in that system between the high-pressure side of the exhauster and the gas holder, without blowing the seal; so that is a low-pressure connection.

Q. When you say you see no possibility of high-pressure being built up between the gas holder and the exhauster do you mean higher than this one or two pounds to which you referred?

A. Higher than what might be determined by the capacity of the gas holder or by the ability of the gas holder as it is usually run to withstand that pressure.

(Testimony of William Howard Clapp)

Q. Which you understand is one or two pounds per square [1204] inch, is that correct?

A. Yes; usually around a pound, which would mean about the difference in head water of 2.3 feet, say, between the cylinders.

The pressure on the other side of exhauster 81 must be even lower. There is shown a by-pass by means, whereby by means of a diaphragm valve gas may pass back from the high-pressure to the lower side, depending upon the adjustment of the valve, but from there on to the exhaust, through the outlets 55 into the jacket 53 and from there on out of the jacket into the pipe 80, as shown in Fig. 2, there is necessarily a low-pressure system.

I spoke of the actuation of the closure head and of the pressing plunger.

Q. Professor Clapp, if you will pardon the interruption and before you get to your discussion of the closure head, as I understand your testimony with respect to this showing of Fig. 1 of the patent in suit, it is that in accordance with the teaching of this patent, if the gas holder 12 at the bottom of that diagram is of the usual inverted bell type, as described in the patent, it would be impossible to have a pressure in the line 83 between the gas holder and the exhauster 81 of more than one or two pounds per square inch, in that neighborhood?

A. That is right; yes.

Q. There has been some testimony in this case with [1205] respect to operations in which carbon dioxide gas was fed back into the snow chamber 50 or a similar snow chamber when the liquid inlet was closed, to build up in there a pressure of the carbon dioxide gas of 40 pounds or 30 pounds or 50 pounds. In view of the disclosure of

(Testimony of William Howard Clapp)

this patent, would it be possible with the apparatus in Fig. 1 to do so? A. No.

Q. By the Court: Let us make it 20 pounds, could you do it?

Q. By Mr. Foster: Could you do it with 20 pounds? Could you build up a pressure in the snow chamber of 20 pounds by opening the line 83 and other connections back to that snow chamber 50?

A. Well, it would depend upon the length of those lines and the diameter of the pipe and the amount of friction that was generated, that creates the pressure.

Q. Understand my question is this, Professor: With your head of pressure in the chamber 50 down to atmospheric pressure, is it possible, or what is the maximum pressure that you could develop in that chamber 50 from the return of carbon dioxide gas from the gas holder 12 and back through the line 83 into the snow chamber?

A. As I understand the question, with the inlet valve closed?

Q. With the inlet valve closed.

A. It might be a couple of pounds. [1206]

Mr. Foster: Is the description clear, your Honor? Are there any questions on that? The Professor was turning to a description of another part now. Perhaps I can ask a question there that would clarify it somewhat for the record.

Q. As I understood your testimony, Professor, this line, this gas line 80 which is the CO<sub>2</sub> gas line between the snow chamber 50 and the remainder of the system, connects to the exhauster 81 so that the pressure in it on the snow tank side of the exhauster 81 is less than the pressure on the exhaust side of that exhauster 81?

A. That is right; yes.

(Testimony of William Howard Clapp)

Q. And the maximum pressure on the exhaust side of the exhauster 81 must be no more than a pound or two if the gas holder 12 connected thereto is as described in the patent, of the usual inverted bell type?

A. Yes.

Q. And that that situation would not permit the pressure in that line 80 of gas being returned to the chamber 50, with the chamber 50 at atmospheric pressure, to exceed more than a pound or two per square inch?

A. No.

Q. And that situation is not altered by this by-pass through the diaphragm valve 84, since the maximum pressure which can communicate is the pressure in the line 83, which is again controlled by this gas holder 12, is that correct?

A. That is right. This diaphragm valve would be [1207] adjusted to operate for a difference in pressures on the two sides. At most it could only return a pressure to that on the high side.

Q. Which is controlled by the pressure in the line 83 and gas holder 12, is that correct?

A. That is correct.

Mr. Foster: Did the court have any questions on that point?

The Witness: I spoke of—

Mr. Foster: Just a moment, Professor Clapp. Perhaps the court has a question. If the testimony is not perfectly clear to your Honor, perhaps by reference to the enlargement, Professor Clapp might be of assistance to the court in explaining that situation.

Q. By the Court: Where on that No. 1 is the original inlet of your material, your CO<sub>2</sub>?

(Testimony of William Howard Clapp)

Mr. Foster: May I approach your Honor?

A. To the exhauster 11.

The Court: Yes. When this excess material comes back through the exhauster 81, feeds down through 83 into the gas holder, the pressure here has got to be relatively the same or a little less than the pressure here, hasn't it?

A. Yes.

Q. In order to make it run in there?

A. Yes, sir.

Q. Now, if it comes out of the gas holder and goes up [1208] here into the compressor and goes back into the system—

A. Then we are told it is compressed to 1500 pounds per square inch and exists through pipe 16 back to the system again.

Q. Isn't there some way by that process to get that in such a way as to increase the pressure in the chamber?

A. The inlet valve is on the high-pressure side of the system.

Q. That is right.

A. The exhaust valve is on the low-pressure side of the system.

Q. That is right.

A. There is no connection between those two sets of pipes, and the return is—

Q. I see. There is nothing indicated in the patent to accomplish that, is your point?

A. Yes, sir; there is nothing indicated.

Q. You would not have much trouble in doing it, would you?

A. No; but I don't see that the patent discloses any intention to do it.



(Testimony of William Howard Clapp)

The Court: That is my point.

The Witness: Yes.

Q. By Mr. Foster: You were commencing to describe the construction and operation of the plunger, I think, Professor Clapp, when I interrupted you.

A. I would refer to the dotted lines, first, in cylinders [1209] 66 and 68, which represent the liquid level as it should exist when the pressing plunger or the actuating plunger 63 has been moved to left-hand position and fluid is down in tank 68 under the high-pressure gas connection and its level in tank 66, when the liquid back of the actuating piston has been forced out into the tank 66 and gas has been caused to pass out into the low-pressure line. That is as it should be for operation.

Now, turning to 75 and—

Q. By the Court: For the initiation of the operation?

A. For the initiation of the operation of this actuating piston and the ram.

Q. Yes.

A. Turning to the other side, we find that liquid has gone down in tank 75 and up in tank 77, but the actuating head is shown in its right-hand position. There is no way in which it could be brought to closure without letting high-pressure gas into this system through pipe 74 and blowing the liquid out through pipe 76 and cylinder 77 into the high-pressure side—no; into the low-pressure side of the system.

The Court: The low-pressure side.

A. But that is not the worst of it. We refer to this actuating level which operates the valve 39. As shown in this position the valve is open. It will be closed when the ram 61 advances to close the chamber and contact

(Testimony of William Howard Clapp)

is made between 94 and the other end of the bell crank lever 92 to [1210] throw the lever on valve 39 up so that liquid  $\text{CO}_2$  is entering the system here and is passing out through the mouth of the open end of the cylinder 60.

Q. By Mr. Foster: Do I understand that, as the apparatus is illustrated in Fig. 1, it is not operative to produce compressed blocks of solid  $\text{CO}_2$ . Professor Clapp?

Mr. L. S. Lyon: I object to that as no foundation laid, your Honor.

Mr. Foster: He has just been testifying to it.

The Court: That seems to be the point of what he has just said.

Q. In your judgment, the hook-up won't work, is that right?

A. In my judgment, with the arrangement of liquid in cylinders 75 and 77 and of the plunger in cylinder 71, the hook-up will not work. Liquid carbon dioxide is certainly blowing out through the opening in the bottom of the snow chamber and out through the outlet of pressing chamber 60.

Q. If nothing happened to it from the time it came in, it would follow the line of least resistance and go to the atmospheric outlet, wouldn't it? A. That is true.

Q. Suppose that it started solidifying, then it would not go out, would it? Suppose the liquid comes in from the nozzle and it is diffused and then it solidifies, it would not be flowing out there very long because it would block [1211] itself automatically, wouldn't it?

A. Well, that is a pretty big opening in that hole of the open end of cylinder 60 and the snow chamber, and we understand that this is liquid carbon dioxide which must come in.

(Testimony of William Howard Clapp)

Q. Suppose that you just move that up closer to the closure there, wouldn't that do it?

A. Yes; that would do it. To do that there—

Q. What is that number, No. 70?

A. Yes; 70 is shown open and there has been an error in the dotted lines in cylinders 75 and 77 evidently.

Q. Yes. You could not make that contact unless you reversed this? A. No.

Q. But that is just a detail, isn't it?

A. Yes; I think that is a detail, but I think that showing this valve in open position and the cap away from the closure is—well, I said it was cursory; it is a little diagrammatically out.

Q. Of course, I have to understand this Doctor. I am not so much interested in this Figure, because, while I did not understand at the time and was going to ask you later what you meant by "cursory", I assumed that you meant that it was what we would say as laymen "casual"; that it was not supposed to be accurate or to show the various positions of the apparatus at various times? [1212]

A. Well, I meant superficial and, perhaps, a hint of carelessness.

Q. Now, what about the words as distinct from the diagram?

A. Yes; the word discloses carbon dioxide enters the snow chamber; that it is expanded and that the snow drops into the cylinder 60; that it is compressed against the closure head 70.

Q. The same meaning as the words indicate?

A. Yes.

The Court: Very well.

(Testimony of William Howard Clapp)

Q. By Mr. Foster: With reference to this chart, Exhibit FF, will you state to the court what you had to do with its preparation?

A. Mr. Foster gave me the Cole patent, asked me to read it. He gave me the elements that are indicated by the letters A to G2 on the chart and the patents that are shown here, and asked me to read them and to prepare a list where I found corresponding elements to those given in the Cole patent or to any of these headings.

Q. Is this chart, Exhibit FF, prepared in its final form under your direction?

A. Yes. I made it in pencil form and it was inked and photographed under my direction.

Q. You may refer to that if you wish in answering this next question. Would you just briefly summarize the elements [1213] that you found in this Cole and McLaren patent in suit?

Mr. L. S. Lyon: I object to that as too general, your Honor.

The Court: Yes; I think it is a little general. Let us give the doctor a little rest. He has been at this for some time now. Take a little smoke.

(Short recess.) [1214]

Q. Professor, will you now direct your attention to the patent to Cartier, granted in 1886, Defendants' Exhibit EE-1, and point out to the court what is there disclosed?

A. The Cartier patent shows an oil press consisting of a pressing cylinder, described—there is just one page, at lines 27 to 30; cylinder B, covered with a lid or closure head D, described on lines 27 to 30, actuated by a screw mechanism V in Fig. 1, and similar closure heads and screw mechanisms V' and D' are shown in the right-

(Testimony of William Howard Clapp)

hand drawing. The left-hand closure head comes down in contact with the open end of the cylinder B. There are provided perforated plates marked E, and a suitable filter cloth marked F, so that liquid may percolate out through the openings and pass down, as shown, through a hole connected to a spout at the bottom of cylinder B; that is, to the bottom A, which in Figure 1 is shown to be bolted to cylinder B.

There is described a pressing plunger, which is similarly covered with a perforated plate, and with filter cloth, so that the plunger leaks and oil may be passed out through the bottom of this plunger, as described, the reference to the plunger being on page 1, lines 17 to 26.

Means for moving the plunger, lines 37 to 43, in which we are told that a hand press, embodying this invention, and the plunger D', at the top of the vessel, are actuated [1215] by the screw V, or equivalent; that is, a cap; the bottom capable of being raised by a rack-and-pinion arrangement. This description is contained in lines 34 to 40. Also it is stated:

"The construction is otherwise substantially the same as that of the hydraulic press, and will be understood from the foregoing description."

Equivalent means are given for operating the plunger.

Q. What is your understanding of the means referred to by that term, Professor, for actuating the lid and plunger?

A. Equivalent means are any mechanical means for accomplishing the same object. The plunger or the head might be actuated by fluid cylinders, using liquid, gases, or steam; it might be operated by a crank and rod mechanism, or by an eccentric, or through a rotating



(Testimony of William Howard Clapp)

shaft and a toggle device. Any means for causing the piston to move in its path and exert the desirable pressure, or equivalent.

Q. In the left-hand view of the pressing plunger, which I believe is C, does the patent state whether or not that is operated hydraulically?

A. Yes; lines 34 to 36.

Q. I call your attention to lines 18 to 20.

A. That is the rod of a piston or hydraulic ram. That is not entered up on my diagram.

To summarize, there is disclosed a chamber or mold, [1216] closure head, means for opening the chamber on the outside, an outlet for fluid, either through the cap D or through the piston, or the ram C; a pressing plunger, a means for moving the plunger, one of them being through a pressure means.

Q. What is your understanding of the manner in which the compressed material is removed from the chamber B in accordance with the patent of 1886?

A. Material is removed by raising the cap and moving the piston to eject the material from the top of the cylinder.

Q. Had you completed your answer?

A. I have.

Q. I will next direct your attention to the Sailor patent, issued in 1892, Defendants' Exhibit EE-2, and ask you to explain to the court what is disclosed. [1217]

\* \* \* \* \*

A. Sailor describes a cotton press, containing a pressing box, open at each end, marked X.

The Court: May I interrupt you to say this: It doesn't seem to me that it makes very much difference, so

(Testimony of William Howard Clapp)

far as we are concerned here, with the method by which these pistons are actuated. That can be done in any number of ways; it can be done manually; it can be done by hydraulic pressure; it can be done by liquid pressure; it can be done by all sorts of different ways; so, unless there is some particular point in it, all you need to say is that the pressure is mechanically applied in such and such a way, as described in the patent, and unless some one wants to have it more clarified, or if there is any particular point in the means by which this pressure is applied, he may so state.

Mr. Foster: Only these claims 4 and 34 relied upon specify particularly that the means for operating the closure head are fluid pressure operated, and claim 33 relied upon specifies that the pressing plunger is operated hydraulically. The other mechanical combination claims just recite means, and they are, as indicated, any means. But these three claims specify hydraulic means in particular. That is the reason why our outline heading was: Fluid pressure operated means for the press, because three of the claims do specify that particularly. However, I am content that [1219] he do not testify in detail to the fluid content. Probably the witness can say it is hydraulically operated, or not.

A. This vertical box or cylinder marked X is shown in Figure 1 as containing the cotton. It is referred to on page 1, lines 25 to 30. There is the top closure, marked D in Figure 2. That is also shown in Figure 1, in its raised position, and is described on page 1, lines 40 to 44. Means for actuating the closure, fluid means, page 1, 46 to 49, and 59 to 62. There is a pressing plunger, similarly actuated, and described on page 1, lines

(Testimony of William Howard Clapp)

25 to 30, 43 to 45, with a plunger, 46 to 49, 62 to 71, page 1, for actuating means.

The Court: Professor, I think maybe we can save you a lot of trouble about your references to express the wording of the patent, in so far as they are indicated on the chart, all you need to do is say "as indicated in the patent." If I don't understand it, I will read this. I will have to look at it anyway. So, without reference to what the patent says, it will be assumed you are describing what the patent discloses, if you just describe the apparatus. I can follow it as you do that, without reference to these pages, because if I am specially interested in anything, or in doubt about anything, or don't understand about anything, I will read the description in the patent or ask you. Is that satisfactory? [1220]

Mr. Foster: Very, your Honor. That is the prime purpose of the chart.

A. In operation the cotton is charged in at the top, and can be pressed down by the upper closure or piston, and when a sufficient amount has been accumulated the lower piston, which is actuated by a somewhat more powerful cylinder, is caused to raise, and the final compression is brought against the closure head R, as shown in Figure 2.

The Court: Is there any provision provided for any moisture or liquid?

A. Bale bands are provided in both the upper and lower rams, and this would make means for the gas to escape as the cotton is compressed.

The Court: What do you mean by bale bands?

A. For tying the band. It is necessary, so we get a cord or string around the bale while it is still being pressed.

(Testimony of William Howard Clapp)

Q. By Mr. Foster: Are those the recesses shown, the cut-away notches in the plunger and head N and D in the drawing?

A. They are. To summarize, there is disclosed a chamber or mold, closure head, a fluid pressure closure, drive plunger that leaks, and a fluid pressure operation of the plunger.

Q. I wish to call your attention to one thing, and I think I can do it more quickly by reading from the patent. [1221] Page 1, line 50.

"As any suitable arrangement of valves, pipes, pumps, & 3., may be employed to conduct the fluid to the cylinders I have not deemed it necessary to show and describe them in this specification."

And the statement, page 1, line 100:

"for instance, any other suitable mechanism \* \* \* may be employed to operate the platens."

as supporting the statement made a moment ago that all these means, as well as hydraulic means, are well known.

Professor Clapp, please direct your attention to the Holden patent, 530,526, issued in 1894, Defendants' Exhibit EE-3, and briefly describe what is there disclosed.

A. This patent describes a method of pressing chips of ice to form solid blocks. There is a freezing chamber through which water enters at the bottom through the pipe E, and is refrigerated by suitable coils, as shown, the ice rising to the top, and dropping down over the edge of the pipe D into the hopper K of a horizontally disposed cylinder.

There is a closure head of sorts shown at O, actuated by springs P, by means of which pressure may be put upon

(Testimony of William Howard Clapp)

the ice as it is being pressed. I note by measuring that these lids are capable of folding up and covering the opening, but I do not think that was the intention of the patent. The ice is then forced out against the stop R. [1222] There is a piston shown at the left of the cylinder. The piston has holes in it through which any water may pass out to the rear and be caught in a suitable manner.

The Court: These flanges on that closure, if you closed them way down, it wouldn't do you any good; there wouldn't be anything to hold against, would there? They are designed to be screwed down against something that is tangible?

A. I think they are designed to screw down against each other to make a V-shaped closure to start the compression of the ice.

The Court: Against each other?

A. Yes, although they are of such length that they can cover the openings if the springs were adapted to hold up.

Q. By Mr. Foster: Is it the teaching of the patent that these closures O and the block R will be used as a head against which to compress the block of ice that is being compressed by the plunger I?

A. Yes. There is also shown a gate valve or closure L at the bottom of the ice-forming chamber, by which an accumulation of material may be made, and may be dropped down into the hopper in front of the pressing plunger.

To summarize, there is shown a chamber or mold, closure head, and supply or inlet through the water, fluid, so water and ice may pass into the hopper; an outlet for



(Testimony of William Howard Clapp)

the fluid or any gas, a plunger that leaks, and means for operating [1223] the plunger.

Q. Professor Clapp, is the purpose of the apparatus as illustrated and described in this patent to continue the accumulation of solidified matter in the chamber D without interrupting it for the pressing operation that is performed in the pressing chamber H?

A. Yes, if the gate L is closed we may continue to accumulate there until the cylinder D is full.

Q. I wish to call your attention to the statement on page 1, line 77:

"The piston I receives motion from a crank and connecting rod or by a screw or any other suitable power, so that the piston rod gives motion to the piston I and carries the ice crystals or chips along within the solidifying trunk H and applies the necessary pressure to cause the particles of ice to adhere together."

The variety of the actuating means is the point of my reading that portion.

Q. Professor Clapp, will you now direct your attention to another Holden patent, 876,352, issued in 1908, which is Defendants' Exhibit EE-7? I will take that up, if the court please, a little out of order, because it is of the same patentee.

A. There are shown here views in side elevation, and in plan. Figs. 1 and 2, of another ice pressing or gas solidifying device, in which the actuating piston is [1224] placed in the middle of a tandem arrangement at 2, and there are two cylinders, 3 and 4, at either end, in which the ice is pressed. There are actuating rams in the cylinders marked 18 and 19, and their outline is shown in dotted lines.

(Testimony of William Howard Clapp)

Q. In which figure?

A. In Figure 1. Each of these cylinders is open at the end, but have closure gates marked 13 and 14, which are of wedge-shaped form, and are arranged to slide within guides, so that when the gate is down it closes the opening and seals the end of the cylinder. These gates are shown to be actuated hydraulically through cylinders 26 and 27.

In the right-hand view gate 13 is shown to be raised. Piston 18 has injected the ice block. Piston 19 has moved over to the right-hand end of the cylinder, both rams being actuated by the actuating ram in cylinder 2. There are inlet valves to the cylinder through which the ice chips may flow, these valves being marked 22 and 23. Valve 23 is open for the entrance of ice, which comes down to pipe 26 and enters at the bottom of the cylinder. A provision is made for the water and any entrained air, as the patent says, to escape through pipes 52 and 53 respectively, at the top of the cylinder.

The Court: A kind of tandem arrangement?

A. It is a tandem arrangement, with operating means at the middle. There is a closed head and chamber mold, [1225] a closure lid, fluid means for operating the closure lid, a supply or inlet for ice and fluid, an outlet for fluid or any gas, a pressing plunger, a fluid pressure means for operating the plunger.

Q. You have described the particular form of these closure gates, indicated as 13 and 14, as described in detail in the patent, as being rather triangular gates or closure members. What is their use or purpose?

A. I said they were of wedge-shaped construction. They are shown in Figure 2 in plan, as being enveloped

(Testimony of William Howard Clapp)

by a portion of the cylinder at either end so as to make guides of similar contours upon which they slide.

Q. In your experience when such gates or closure members are employed, of that form, do they provide a good seal?           A. Yes.

Q. I refer to the patent which expressly states there is an outlet for the air, to the statement on page 2, line 43:

“The presses 3, 4, have perforated linings, for which I was granted Patent 730,018, June 2, 1903, the upper and side perforations in connection with the pipes 52, 53, will remove any air carried into the presses with the ice particles,”

A. That is correct.

“and the lower perforations permit the escape of any water, so that the ice block is perfectly pellucid.” [1226]

I notice another patent of Holden. Did the court have any questions on this patent?

There is a word I never saw before—“pellucid.”

A. Originally it meant translucent. It now means transparent.

Mr. Foster: Why the patent didn't say so, I don't know.

Q. I direct your attention to Holden patent 1,054,772, which is Defendants' Exhibit EE-10. Will you point out what is there described?

A. This is a very similar device. The arrangement here consists of two actuating cylinders, and two pressing chambers, as shown in Figure 1, so that it is a duplex rather than tandem arrangement. The sectional view in Figure 2 shows much more clearly the arrangement.

There is shown a pressing chamber for ice blocks 22, and a ram 29, actuated through the rod 28 by the piston

(Testimony of William Howard Clapp)

27, in the hydraulic cylinder 21. Fluid enters at the bottom through the opening shown in Figure 2.

Q. That is the opening directly underneath the plunger 29?

A. The opening directly underneath the plunger; and escapes in a manner similar to that described in the last patent, around the walls of the chamber through a grid, and out at the opening 57 in the top of the chamber.

The closure head is perhaps a little more clearly shown [1227] in this view, which is a section through the middle. The grids being shown partly dotted, and connected with the operating fluid controlling means, being clearly shown, both the closures, head and ram, are actuated by hand control through levers, as indicated at the right of Figure 2, so that it is possible to gauge by pressure when the chamber has been filled, as the piston has been moved to the right, to actuate the piston, and later the closure head, as desired for compressing the block and ejecting the block. There is a long detailed description of the valve mechanism, but the previous patent says it may be any well-known device, and a description hardly seems necessary.

To summarize, there is disclosed a chamber or mold, closure head, means for opening the chamber, supply or inlet, outlet for gas and water, pressing plunger, and fluid pressure means for operating both plunger and head. [1228]

Mr. Foster: I might state to the court that one of the reasons we included the later Holden patents was because the first one did not show a closure head as completely as did the later patents, and we wanted a complete picture to be before the court.

(Testimony of William Howard Clapp)

The Witness: I should state that the first patent, I have taken the closure head as making a sealed connection, because all it discloses is this wedge-shaped construction.

Q. Now you are referring to what patent?

A. I am referring to Holden 876,352.

Q. Yes.

A. But the second Holden maybe does show a means for letting any water which might get behind the piston be let out as shown—

Q. Now you are referring to Holden 1,054,772?

A. Right; as shown in Fig. 11.

Q. Would you just point out what is there disclosed?

A. There is there disclosed a side view of the wedge-shaped gate, partly in section, showing a recess 81 covered by perforated plate 82 by means of which any water which gets behind the piston may be caused to flow out over the top of the gate and carried away from the system.

Q. Will you now turn back in your list of art to patent No. 533,871, issued in 1895 to Drummond, which  
(EE)

is Exhibit FF-4, and point out to the court what is there disclosed? [1229]

A. This is a press for pressing out the juice from cane. The cane is cut up into small pieces and charged into the chamber or crushing vessel A. Steam may be admitted to the chamber from a pipe L for the purpose of making extraction of the juices more readily accomplished. There is a closure head E which is really actuated by two cylinders, one, the top cylinder, through the small rod D, may compress the cane, actuated by steam or air, compress the cane and press it down into the cylinder. For pressing out the juice there is a surrounding cylinder C<sup>1</sup>, or



(Testimony of William Howard Clapp)

surrounding piston C<sup>1</sup> in cylinder C which is operated by fluid means and which presses down against the head E and permits a considerable pressure to be put on the cane. After the juices have been extracted, the piston head E or closure head E is raised, the materials raised out through a piston F at the bottom of the cylinder, actuated by the fluid means through cylinder F<sup>2</sup>, and a piston rod F<sup>1</sup>. While the cylinders, as shown, represent the pressing as taking place through the actuation of piston E, it is just a question of the size of actuating cylinders employed. The same method of pressing might be made against E as a head, after which the material could be ejected.

Q. Is the outlet at C disclosed as withdrawing under a suction the liquid and gases which are introduced?

A. Yes. References are given in the chart which show the outlet of gases to some form of extraction device through [1230] openings at C in the bottom of the chamber.

To summarize, there is disclosed chamber or mold, closure lid, fluid pressure means for operating the closure lid, a supply or inlet for steam, an outlet for liquid and vapor, pressing plunger, and fluid pressure means for actuating the plunger.

Mr. Foster: Were there any questions on this patent that the court had?

Q. By the Court: This rod d with the piston head E, in its original operation is just a tamp, isn't it?

A. It is just a tamp, yes; and then the other cylinder—

Q. Then they put the hydraulic pressure on it and they give it the works?

A. That is it.

(Testimony of William Howard Clapp)

Q. By Mr. Foster: Would you next direct your attention to the patent to Gaylord, 760,191, issued in 1904, Defendants' EE-6, and point out what is there disclosed?

A. Gaylord discloses a method of pressing powdered amber into molds for the purpose of making articles such as the pipe stem which is illustrated here in Fig. 2 and Fig. 3. The chamber consists of two parts, one at the right in Figs. 2 and 3, which contain the powdered amber which is heated to a suitable temperature and then pressed out into a mold of correct shape, as shown in the left-hand figure, and while under pressure formed into the article desired.

Considerable description is gone into in connection with [1231] these molds, with emphasis upon making them perfectly tight and easily taken apart. For example, the mold in which the greater part of the stem of the pipe is made is made into two parts, marked 7 and 8 in Fig. 3, with connection on a longitudinal plane, all fitted very nicely. There is another part of the mold there which is shown and a closure head marked 13.

Q. That is to the left, to the extreme left of the figure?

A. At the extreme left, which head is described in the patent as being able to make a complete seal, or to be withdrawn slightly so as to allow gases to escape, the purpose being that in one case, when it is a complete seal, they get cloudy amber, and when it is withdrawn and the gas is allowed to escape, they get clearer amber.

There is a piston 4 with a very closely-fitting disc 3 in front of it by which, by some means, pressure may be put upon the amber and force it into the left-hand part of the chamber, the mold.

(Testimony of William Howard Clapp)

And, summarizing, there is described a combined chamber and pressing mold, a closure lid or head which can be operated by some means, manual, perhaps, an outlet for gas when the closure head is slightly withdrawn, a pressing plunger and some means for actuating the plunger.

The Court: I think I saw this machine in operation in one of the manufacturing establishments in the east when we [1232] used to buy ambroid. I think it is exactly this machine.

I think we had better take our midday recess.

Mr. Foster: May I have the court's indulgence for one moment? We have had this model here in court for several days, waiting until we should put on our experts. If the plaintiffs are willing to stipulate that solid carbon dioxide ice, triple point ice can be produced in it and taken from it, we do not need to ask the court for the privilege of making a demonstration in the courtroom. The demonstration requires two tanks. If they are not willing to stipulate, we wish to ask the court if it would be permitted that we have two tanks, your Honor?

Mr. L. S. Lyon: May I ask what this is supposed to be a model of?

Mr. Foster: Yes. It is a model—

The Court: Suppose you talk it over among yourselves after recess and see what you can accomplish.

Mr. Foster: Would the court have any objection, if we cannot reach a stipulation, to our bringing in two of the tanks?

The Court: No; I have no objection.

(Whereupon a recess was taken until 2:00 o'clock p. m. of the same day.) [1233]

## AFTERNOON SESSION

2:00 O'CLOCK.

The Court: You may proceed.

Mr. Foster: With the court's indulgence, the stipulation sought by defendants from the plaintiffs was declined by the plaintiffs, and we think it would be of interest to the court to observe the making of some solid carbon dioxide in the model which has been in the courtroom for several days and which the later testimony will tie into the prior art. It will take only a very few minutes, and we have Mr. Wilson here, who is an employee of the defendant, and Mr. Wilson, if it is agreeable to the court, will conduct the operation.

I wish to explain to the court that, of course, this model is not a commercial device, but, like commercial devices, it must reach the proper temperature before the most perfect results are obtained, and this machine has been operated only a very few minutes and is not anywhere near the temperature at which commercial devices would be, that is, the metal walls and so on. And, as I say, it is not a commercial device, but we think it will illustrate our point to the court. If the court is agreeable, when Mr. Wilson conducts the operations, may I, with someone from the plaintiffs checking me, give to the reporter observations of lengths of times and the pressures so that the record may [1234] show?

The Court: Very well.

Mr. Foster: Mr. Wilson, will you come forward, and if the plaintiffs or their experts would like to look?

Mr. L. S. Lyon: I do not understand the statements made about the temperature. This is supposed to be a soap-making device and you flow in hot soap into it, hot soap material. I don't know what the statement was.

whether it has not been heated up enough or what happened to it.

Mr. Foster: The statement, Mr. Lyon, was that, unlike the commercial operations of the defendant, the machine had not reached that low temperature at which it operated most efficiently. Mr. Lyon has referred to the Stastney patent and that patent teaches that cool air may be introduced in the two lower pipes of the model, which is the central device, which exerted a cooling effect upon the inner concentric chamber. We have not circulated the cooling air, Mr. Lyon, around that inner chamber.

Would you point out, Mr. Wilson, so that plaintiffs' counsel and experts may see? We place a small cake of ice in here, your Honor.

Mr. Morris: May Dr. Jones come in and observe it?

The Court: He may. I am going to go down there so that I can see it.

Mr. Foster: We had for the last very few minutes a cake of CO<sub>2</sub> ice near the inner concentric chamber in an attempt to [1235] reduce that temperature. And if you would remove that? And the plaintiffs' experts are invited to inspect it to see that there is no solid carbon dioxide in the device now.

There is in the bottom of the inner chamber, your Honor, as the evidence will show, a small piston. That is the bottom wall that you look at now as you peer into it.

Mr. Jones: Do you want to show the piston removed?

Mr. Foster: We will remove the piston. I thought we would make the block and then we will.

Mr. Wilson, will you proceed to put the top on that device?

May the record show he is placing a sheet of rubber on top of the two concentric cylinders and then placing a



head plate on top of the rubber plate and securing it in place with four bolts.

We did not take the time to have this photographed, your Honor, and I think possibly your Honor can indicate if he wishes it, and it might be well at the completion of the tests for one of the representatives of the plaintiffs and the defendant company to have it photographed so the record may show it.

The pressure gauge communicates with the inner of the two concentric cylinders and will indicate the pressure therein. The tank which is on the upright stand is the tank of liquid carbon dioxide with some gas in it and it is connected through the copper tubing to the device. The two pipes near the bottom which exhaust into the atmosphere are [1236] merely connected to the space between the two concentric cylinders.

If you wish to time this, Mr. Jones, I have a stop watch here.

Mr. Jones: That is all right; go ahead with it.

Mr. Foster: Whenever you are ready to start the liquid carbon dioxide inlet into the device, let me know.

The pressure has risen to a little in excess of 60 pounds. It fluctuates somewhat, but is being maintained.

Mr. Jones: Can't we position that so that the court and myself can see that gauge without standing between the wall and this affair here?

Mr. Foster: I think if you will come over here, Dr. Jones?

Mr. Jones: I don't know whether I am that enthusiastic or not. It will help some, anyway.

Mr. Foster: It is 30 seconds, Mr. Wilson. The pressure drops there for a few seconds and fluctuates and then raises. At one minute, Mr. Wilson, the pressure for the last few seconds has been at about 75 or 70.

Since the last observation the gauge has remained at about 70 to 75. It is now a minute and 35 seconds, Mr. Wilson. One minute and 45 seconds. Fifty seconds; fifty-five seconds; it is two minutes, Mr. Wilson.

Mr. Wilson has shut off the liquid inlet valve at two-minute interval and the pressure on the gauge on the device [1237] remaining at between 70 to 75 pounds since the last observation of the pressure.

Do you agree that is right, Dr. Jones?

Mr. Jones: To the time the valve was closed.

Mr. Foster: Yes. Then it diminished and it is now falling.

Mr. Jones: It dropped to 60 pounds and remained at 60 pounds for a period of about 30 seconds.

The Court: After the valve was closed at first.

Mr. Jones: After the valve was closed.

Mr. Foster: Would you proceed now, Mr. Wilson? Mr. Wilson is now connecting the inlet at the bottom of the model to a tank of CO<sub>2</sub> gas, and now opens the valve in the CO<sub>2</sub> gas connected to the model.

Mr. Jones: May the record show that Mr. Wilson was compelled to disconnect the cylinder in order to relieve the pressure beneath the piston and that the release of gas through the block formed continued throughout the pressing operation, so that some gas was conducted through the block being formed while the pressing operation was conducted?

Mr. Foster: I do not believe that is correct in all respects. I think that the pressing operation was initiated and after perceptible interval after the carbon dioxide gas was introduced at the bottom of the model, there was a sudden outrush of the gas from the valve pipe connected below the dial; and there was a little interval there, I think, and [1238] that outrush of gas continued while the

pressure indicated by the gauge dropped down again to atmospheric.

Mr. Jones: I think the record shows both comments, and also should show that the gauge showed rather violent fluctuation indicating a release of gas in considerable pressure, varying from zero to greater than 150 pounds during the pressing operation.

Mr. Foster: I think probably what happened upon observing that flow of gas is that the piston, which we found shortly before the noon recess had become somewhat corroded in that cylinder during the days it was standing here, and permitted gas to escape therepast.

Mr. Jones: This operation is not complete yet.

Mr. Foster: No. Mr. Wilson is now removing the bolts from the top of the device, the model, and removing the top plate.

Mr. Jones: It blew out.

Mr. L. S. Lyon: Your Honor is following what they have to do to get this product out of this tank?

Mr. Foster: The rush of gas past the piston prevented from getting a cake of substantial proportions, and I think the temperature, the high temperature of the device contributed to it.

Mr. Jones: I do not think there is any objection or intention to prevent you giving a nice demonstration. What is the objection to taking the bottom plunger off, starting [1239] all over again, and making a good cake?

Mr. Foster: All right; let us do that. Can you take off the bottom connection, Mr. Wilson, so we can remove the piston and show the piston?

Mr. Miketta: May we ask Mr. Wilson whether there is enough liquid in the tank?

Mr. Wilson: I wouldn't think so, sir.

Mr. Foster: I think we have some more liquid, your Honor.

Mr. L. S. Lyon: What are they doing now? Does the record show?

Mr. Foster: Taking the connection off the bottom.

Mr. Jones: He is going to take the piston out bodily and make a fresh start.

Mr. L. S. Lyon: Would you have to do that in operating the device? Do you have to take it apart to remove the piston?

Mr. Jones: I really couldn't say. I was only suggesting that they get a clean start and make a good block.

Mr. L. S. Lyon: Is it intended that the record should show that there was a block made by this demonstration?

Mr. Foster: No; it is not intended that it should show a complete block. There was some solid carbon dioxide, but we did not produce in the first operation a block shaped as is the center cylinder.

I may state, in attempting to cool the device here in the last few minutes in the courtroom, that these were [1240] produced, and then the device apparently has warmed up somewhat (indicating samples of product).

Mr. Jones: I would like the record to show that the cold chamber is commencing now to formulate water frost on its inner surface from its normal condensation from the air of the room.

Mr. Foster: If the court please, the zero point on the gauge is out of order, so the needle does not register on the zero point, and rather than conduct the second test, as suggested by Dr. Jones, while the gauge is not accurately indicating the pressure, I ask to make the demonstration at a later time.

The Court: Very well.

Mr. Foster: Professor Clapp, will you resume the stand? I might state, because I think the court will be interested, and I neglected to do so, that the Cartier patent, No. 1 of Defendants' Exhibit EE, was not a file wrapper reference cited by the Patent Office in the prosecution of the application, nor was the Sailor patent 467,783. The first Holden patent was. That was the one that did not have the closure gates on the compressing chamber, but Holden patent No. 10 was not, nor was the Holden patent, which is No. 7, and the Drummond patent, which Professor Clapp has discussed, was not a file wrapper reference; nor was the Gaylord patent. Only one of them, the first Holden patent, was a file wrapper reference. [1241]

WILLIAM HOWARD CLAPP,

resumed.

Direct Examination

continued.

Q. By Mr. Foster: Professor Clapp, will you turn next to patent 955,454, issued in 1910 to Flemming, and, inasmuch as the patent to Julius, 1,018,568, issued in 1912, appears to be very similar, would you consider them together, and point out to the court what is there disclosed? They have the numbers 8 and 9 on Defendants' Exhibit EE. Neither one of these patents was a file wrapper reference, may it please the court.

A. These patents are devices or machines for making little sticks of carbon dioxide snow, little pencils of snow, and each consists of a cylinder.

In the Flemming patent, 955,454, which I will describe, it is represented by a. This cylinder has a number of holes in it, represented by a'. Surrounding the cylinder



(Testimony of William Howard Clapp)

is a jacket member of some porous material, through which, the patent states, the gas may escape slowly, so that when this cylinder is screwed onto the outlet of the carbon dioxide tank, with the connection b, screwing onto the connection d', the outlet of the tank f, there is a complete closure made. There is a piston within this cylinder. The piston is marked d', and a rod attached to the piston running back to a handle d<sup>3</sup>, which permits it being pushed back and forward and set in a position, as, for instance, indicated by the dotted lines midway along the piston. It will be noted that [1242] the piston has a conical recess in it. The operation consists in withdrawing the piston to some point, as that one indicated by the dotted lines, opening the cock on the cylinder f, permitting the carbonic acid gas, or liquid carbonic acid, or carbon dioxide, to flow into the cylinder, and to expand so that the snow forms in the cylinder. The screw c' may then be loosened, and the stick of snow pushed back against the closed head of the outlet of the cylinder, and this may be repeated several times, until we obtain a fairly compressed stick of snow of a desirable length. The closure of the valve on the cylinder makes a seat against which the snow is compressed.

There is then indicated a chamber or mold, a closure lid or head, means for opening the chamber by unscrewing the device from this connection with the tank, a supply or inlet for carbon dioxide gas, an outlet for gas, a pressing plunger, and means for moving the plunger.

Q. Would you refer now to Julius, No. 1,018,568?

A. The Julius device is very similar, and the number of holes in the wall of the cylinder, with the jacket removed, is indicated in Fig. 1. Instead of pressing the

(Testimony of William Howard Clapp)

plunger back by hand, there is a screw device shown,—two, in fact; one in Fig. 2, and another one in Fig. 7, of a little different type, for compressing the snow against the head of the valve in the tank. There is also shown a quick attachment device, represented by 19—19 is part of it, [1243] anyway, which consists of two U-shaped levers which can be brought over a groove and compress the cylinder down against the closure cock. It does away with the necessity of taking the time to unscrew the device.

Q. Are the wings 16, part of that?

A. The device is shown in Fig. 3, perhaps, to the best advantage, and consists of two U-clamps which fold up as a couple of handles. 19 is one portion of this device, and the other one 18, shown in Fig. 1. There is also shown a little clamping device 21, for holding it rigidly in position.

Q. In this Julius device then, it is possible to compress the solidified carbon dioxide in the expansion and compression chamber to a greater degree, by virtue of the rotation of the thread connection of the plunger of the device than it is possible by merely having the operator press inwardly on any of the plungers?

A. That is right, and the disclosures are the same as shown on the chart.

Q. Will you refer, Professor Clapp, to patent 1,104,920, issued to Osborne, in 1914, entitled: Art of Making Ice, which is No. 11 on Defendants' Exhibit EE, and point out what is there disclosed?

A. There is shown a device for making little pellets of ice or snow, and compressing the same. The cylinder is represented at 6, and going down through the apparatus to the [1244] pressing cylinder 21. There are a number

(Testimony of William Howard Clapp)

of closures shown on this device. 24 is the closure which may be put in place so that the snow may be compressed against it. There is a deflecting apparatus 26, which may be thrown over, as shown in Fig. 2, so that after the material has been compressed it may be ejected from the opening 26. [1245] There is also described, but not shown, as a closure for the opening 25, which is described as the door or the gate valve, a gate valve, as we know, being used for high pressure steam, is capable of making a very tight closure.

Q. Since that is not illustrated in the drawing, will you point out in the patent where reference is made to the gate valve?

A. Page 2, commencing in line 45, I will quote:

"24 designates a pressure head which is adapted to be placed in position between the mold or compression chamber 21 and the cooling chamber 7, in order that this pressure head 24 may cooperate with the platen 22 when compressing the artificially frozen particles of water into a cake of ice. The ice cake is adapted to be discharged from one side of the stand pipe through a suitable opening 25, the latter being normally closed in the operation of the apparatus by a suitable door or gate valve, and positioned opposite to this opening is a movable member 26, the latter being shiftable at the proper time into the path of the cake of ice, for the purpose of deflecting the ice cake through opening 25 and discharging said ice cake from the stand pipe."

Also, on the same page, commencing with line 119:

"The door or gate valve is now adjusted to close the opening 25"—

Q. Did you read that correctly, Professor? [1246]

(Testimony of William Howard Clapp)

The Court: "The door or gate valve"—

Mr. Foster: "is now adjusted to open or close"?

A. "The door or gate valve is now adjusted to open the opening 25 and deflector 26 is moved into a position across the stand pipe. The platen 22 is raised by the action of the hydraulic press in a manner to bring the cake of compressed ice into contact with the deflector 26, the latter offering resistance to the upward movement of the cake of ice and forcing it through opening 25, thereby discharging or ejecting the ice from the stand pipe."

There is also shown, but no description given, of a closure member at the bottom end of the hail forming chamber, and the patent discloses that with means of these doors they are able to make these little pellets of ice continuously, and compress them intermittently.

To summarize, there is disclosed a chamber and a mold, closure lids, means for opening the chamber, supply or inlet, which I don't believe I have described. Water is allowed to spray down through the pipe 15, into the tank 14 from the top and cold air, refrigerated air, is introduced through the pipe 12 through the opening 13, the two commingling, the water falling through the uprising current of air and the air is then carried off through the outlet pipe 9, and is returned to the tank 16 for further cooling.

The Court: Didn't you misspeak there; doesn't that water come in through the conduit 15 into the chamber 6 by [1247] way of a sprinkler 14?

A. Yes. Did I say chamber 14?

The Court: Yes.

A. Yes, it comes in through the pipe 15, through the spraying device 14, into the chamber 6.



(Testimony of William Howard Clapp)

Q. By Mr. Foster: Then the cold air, as I understand you, enters through the pipes 13, and sweeps upwardly around goblets of water, and through the pipe and out?

A. That's right. To finish the disclosure, there is shown a supply or inlet, an outlet for air, pressing plunger, and hydraulic means for moving the plunger.

Q. As I understand you if we regard the gate valve, to which you have referred, which is located about where the lead line from 25 ends, as closed, the interior device would include the chambers 6 and 7, and compressing chamber 21, down near the rearward end; is that correct?

A. That is correct.

Q. Then due to temperature conditions, liquid which is supplied in that chamber is solidified, and the solidified material passes to the compression chamber 21, where it is compressed against the movable head 24?

A. That is right.

Q. When the movable head is removed the compressed block of the liquid material supplied may be displaced from the machine without interrupting the solidifying process that occurs in the chamber? [1248]

A. Yes.

The Court: All they did was to take a little piece of nature; they let water fall through the sprinkler head by gravity, through the cooling chamber, then it drops to meet the upward current of cool air, and freezes the particles of water? A. Yes, sir.

Q. By Mr. Foster: The cold air removed from this solidifying and compressing chamber is returned back to the system, so its value as a cool material is not lost?

A. That is true.



(Testimony of William Howard Clapp)

The Court: You keep on using the air time after time? A. Yes.

Mr. Foster: That patent to Osborne likewise was not a file wrapper reference against the patent in suit.

Q. Will you direct your attention to patent No. 1,288,255, issued in 1918, which is tab 12, Defendants' Exhibit EE, issued to Stastney, and there point out what is there disclosed?

A. Stastney describes a device for cooling soap, which consists of a double wall cylinder 14, having a jacket space, the outer wall being marked No. 5.

Q. Is the double wall chamber 14, Professor Clapp?

A. No.

The Court: Outer wall 5, inner wall 6?

A. I have that pasted over my diagram, so I [1249] can't see it.

The Court: The outer wall 5, the inner wall 6; that is in Figure 1? A. Yes.

The Court: Is it in Figure 2, also?

A. Yes. I should like to have the patent in which these figures have not been covered up, if you don't mind.

The Court: I was wrong about that. He uses 5 to indicate the unit, and 6 is the inner wall, and 7 the outer wall? A. That is right.

The Court: 14 is evidently the piston.

A. 14 is the piston; 16 an inlet for the air. 17 is an outlet. 20 is a stop cock placed on the cover 18, which may be sealed fast to the top of the cylinder 5. Then there are also shown, in Figure 3, down near the bottom, inlet pipes at the right and left, not numbered, for controlling the temperature of the jacket. In operation steam is first circulated through the jacket to warm it. The warm liquid soap is then introduced through

(Testimony of William Howard Clapp)

valve 10. Valve 18 is opened to permit any liquid that rises to escape; steam is withdrawn and carried away, circulated through the jacket coil; the soap then as it would tend to solidify, and might crack, pressure is put on the piston by introducing air through the pipe 16, and the soap is compressed. The head 18 is then withdrawn, and a wire [1250] frame is clamped in its place on top of the cylinder, and the soap is ejected and cut into bars as it passes out of the chamber.

The Court: You start out by putting the steam in that conduit over at the right; you circulate that steam around to bring the temperature of the mold up to about the temperature of that soap; then you take the steam out on the opposite side. [1251]

A. That is right; then cool it with the air the same way.

Q. And they put cold air in to cool the soap down?

A. Yes, sir.

Q. How do they get the soap out—from the top?

A. By introducing air pressure under the piston 14 through pipe 16 and raising the piston and compressing the soap against the head.

Q. By Mr. Foster: The handles 19 are for the purpose of permitting the quick removal of the closure head 18, is that correct, Professor? A. Yes.

Q. And is there any reference in this patent to the escape of gas, for example, air, out of the valve 20?

A. I believe it says that liquid may escape.

•Q. I direct your attention to line 85, page 1.

A. It refers to it as an air vent.

Q. Did you summarize as to this patent?

A. To summarize, there is disclosed a cylinder, a mold, a closure lid or head, means for opening the cham-

(Testimony of William Howard Clapp)

ber, supply inlet, an outlet for gas, a pressing plunger, and a fluid pressure means for operating the plunger.

Q. By the Court: They close off the flow of the soap and they close the flow of the cold air and they cut off the vent at 20, but they keep 12 open all the time to take out anything that has accumulated, is that right? [1252]

A. That is right, sir, your Honor.

Q. By Mr. Foster: The soap inlet as well as the gas outlet has a valve on it, does it, Professor?

A. They do.

Q. Will you direct your attention to the next British patent, No. 13,684, of 1891, issued to Tichborne, for "An Improved Process and Apparatus for the Manufacture of Solid Carbonic Acid," which is tab 26 of Defendants' Exhibit EE, and point out what is there disclosed?

A. This is an apparatus for the manufacture of solid carbonic acid, he calls it, and shows a snow chamber connected by an inlet through pipe G or opening G in the pipe, back to—no—an inlet through the valve c for carbon dioxide which has been previously compressed and liquefied, as illustrated, an outlet means in the top of the snow chamber with a screen so that the carbonic acid, carbon dioxide, may pass back to the system. There is a closure head at the bottom of this pressure tank which is easily removable.

The patent states also, page 2, lines 35 to 41: "It is obvious that the refrigerating chamber D whether fixed or movable may be attached by a suitable supply pipe and cock therein to the condenser and by a return waste pipe to the pump section, or vat, of the generating, purifying, compressing and condensing apparatus for the collection of CO<sub>2</sub>," etc. [1253]

(Testimony of William Howard Clapp)

Also, commencing with line 20: "The said solid  $\text{CO}_2$  may be collected by a suitable door E or exit from the said chamber D and the gaseous portion of the  $\text{CO}_2$  collecting in the upper portion of the chamber, is returned again by the pipe F to the suction pipe a of the pumps, where it will be redrawn into the pumps A, and again passed either with a new charge through the same process of compression, liquefaction, and part solidification, as described above, \* \* \*"

To summarize, there is disclosed a snow chamber, a closure lid or head, means for opening the same, a supply for liquid carbon dioxide gas, an outlet for the gas.

Q. Is it true that with respect to this closed chamber D of the Tichborne patent there is a liquid inlet line for liquid carbon dioxide having a valve for controlling the rate of supply?

A. That is right. The valve is C, I guess, on that.

Q. And also connected to this closed chamber D is an outlet line for gaseous carbon dioxide having a valve interposed which may be used for controlling the rate of egress of the gas from the closed chamber?

A. Yes; that valve being shown over at the left on the downcomer from that return pipe.

Mr. Foster: This patent likewise was not a file wrapper reference, your Honor.

Q. Now will you direct your attention to the British patent No. 7,436, of 1895, to Elworthy, for "Improvements in [1254] Methods of Solidifying Carbon Dioxide, and of Utilizing the Solidified Substance"—that is tab 27 of Defendants' Exhibit EE—and point out what is there disclosed?

A. This is described as "Improvements in Methods of Solidifying Carbon Dioxide, and of Utilizing the Solidi-

(Testimony of William Howard Clapp)

fied Substance." The method of compressing, cooling, liquefying, etc., is shown diagrammatically. A new means is introduced here in that after the carbonic acid  $\text{CO}_2$  has been compressed in three stages, with cooling between the stages, as illustrated by the figure at the left, and then goes to a condenser system, the condenser system is vacuum-jacketed, the air being withdrawn through pipe 5 which may be closed, the patent states, with a cock. The liquefied carbon dioxide is then allowed to expand. It passes out through the valve e at the bottom of the chamber where the coil terminates and enters a cylinder C', where it does mechanical work in driving this crank and rod mechanism, and is further expanded and cooled. The cooled gas then enters a snow chamber f in Fig. 1 at h and the carbon dioxide which does not change into snow is returned around a baffle board marked 10 through an outlet i to the inside of the vacuum-jacketed chamber, where it flows in countercurrent with the descending carbon dioxide in order to liquefy it.

The type of snow tank shows a double-walled chamber, likewise with a vacuum space in the jacket which may be made by suitable vacuum process and closed off. The snow which is [1255] formed leads direct, the patent states, into the chamber at m which, as the figure shows, is in gas-tight communication with the snow-forming chamber. A piston operated by a plunger at n then compresses the snow into what he calls a box, shown at the left hand of the space m. When the box has been filled with snow it may be removed and replaced.



(Testimony of William Howard Clapp)

Q. By the Court: The purpose of that baffle 10 is to concentrate it and spread it out, isn't it?

A. It is to prevent the snow which is formed from going into the exhaust, as far as possible.

Q. The exhaust, is that h or is that i?

A. i. I believe, yes.

To summarize, there is here disclosed a chamber, snow-forming chamber in a unit with a compressing chamber, a closure lid or head, which is the box, means for opening the chamber, a supply inlet for CO<sub>2</sub>, an outlet for CO<sub>2</sub> gas, a pressing plunger, and hydraulic means are described for operating the plunger.

Q. By Mr. Foster: I wish to point out one fact in the patent with respect to the communication between the snow and compressing chambers. Professor Clapp, would you turn to page 4, commencing at line 22, and read that sentence, please?

A. Yes. "f is the double-walled solidifying chamber, also vacuum-jacketed, the bottom of the chamber is preferably made tapering, or funnel-shaped, as shown, and [1256] leads direct into a hydraulic press, the ram or platen of which compresses and snow formed, into the removable box at m."

Q. Because the means of actuating the plunger may be of interest to the court, would you read the sentence beginning at line 35 of the same page?

A. "The snow may be removed from the chamber f, either at intervals, or continuously, by means of a conveyor screw, or other suitable means, and compressed by hydraulic, or other power, direct to solid blocks, or in the manner hereinafter described."

(Testimony of William Howard Clapp)

Q. In your explanation with respect to this double-jacketed tower B, Professor Clapp, I think you referred to the letter e which I find at the lower right of that coil as indicating a valve. Did you intend to do so, e? That is a double-jacketed vessel at the left of Fig. 1, Professor Clapp, under the capital letter B, the heat exchange vessel, and down at the lower right is the letter e; and I think you referred to it as indicating a valve. Did you mean a valve or a line?

A. No; there is a continuous line; the coil passes right directly to the expanding piston C' and expanding cylinder.

Q. Thank you. Now will you direct your attention, please, to patent No. 1,546,681, issued in 1925 to Slate, for "Method and Apparatus for Producing Carbon Dioxide Snow," [1257] which is tab 15 of Defendants' Exhibit EE?

The Court: One thing I did not quite understand in connection with this last patent. I do not think you need to turn to it. There was a box m under the chamber f, and you said it was gas-sealed, that m was gas-sealed. What did you mean by that?

A. The patentee does not mean an open box. He shows later that it can be used to stamp—may I read?

Q. Yes. A. Commencing page 6, line 10.

Q. Wait until I find that. Yes.

A. "Instead of compressing it into the form of large slabs or blocks, the solidified dioxide may be compressed into thin sheets, or slabs, and these slabs may be so constructed, that they may be readily broken up into sticks, rods, tablets, or other small pieces. For the manufacture of aerated beverages without a machine, these pieces may

(Testimony of William Howard Clapp)

be of such a size, as to give off the proper quantity of gas to aerate the water in any given bottle."

Q. To aerate the water.

A. "Without the machine, these pieces may—"

Mr. Foster: I think you were referring to page 6, lines 5 to 10 initially, Professor Clapp.

A. I thought I quoted that. Page 6, lines 5 to 10. "The compressing apparatus is indicated in Fig. 1. m being a receptacle. below the chamber f, into which the carbonic acid [1258] snow passes, and is very forcibly compressed in the receptacle by means of a pressure ram actuated by a hydraulic cylinder n, valves of the usual kind being provided by which water under pressure can be admitted into the cylinder n. When the snow has thus been compressed, the ram is withdrawn and the block of carbonic acid ice removed."

I did not mean to convey the idea that when that box was removed that the system was not open to the atmosphere, any more than when the cap on the Cole device was removed. Wait a minute. I am not going to say that.

The Court: Go back, Mr. Reporter, and find that spot. I should have stopped him right then. He was talking about m in relation to the chamber f. Suppose we take a little recess now until you find it. This case will stand adjourned for a couple of minutes.

(Short recess.)

Mr. Foster: May the court please, before we get to the question the reporter has found, I think, in his notes, we have moved the two tanks and the model out into the hall and we would like the court's permission to remove it to have the gauge repaired.

The Court: Oh, yes, surely.

(Testimony of William Howard Clapp)

(Record read by the reporter as requested.)

The Court: That is what I wanted to have you explain, what you meant by "in gas-tight connection with the snow-forming chamber." [1259]

A. Your Honor, I have given a great deal of study to this figure. Fortunately or unfortunately, there is only one view shown, a side elevation view, which the patent describes as being partly in section; and m is described as the space there into which the snow falls and that space—

Q. By gravity out of the chamber?

A. By gravity out of the chamber.

Q. Yes.

A. That space can be occupied by the piston. When the piston moves over it covers that space and closes it. During the snowing operation if the piston is at the left, we have a closed chamber. In order to remove the box the piston would have to be retracted slightly, in which case it is possible that there might be air inlet there, but during the snowing operation and the pressing operation and until the piston has been retracted some and the box removed, the closure is complete, as I see it.

Perhaps I should go into that a little bit more. This man, Elworthy, is a chemist in Bombay, I believe, India: he is not an engineer.

Mr. L. S. Lyon: I don't know how the witness knows all these things.

Mr. Foster: The patent states, Mr. Lyon, on page 3, that Elworthy is "of Hill Road, Bandra, Bombay, in the Empire of India, Analytical Chemist."

Mr. L. S. Lyon: It doesn't say he is not an engineer. [1260]

A. No: it does not say he is not an engineer but there are indications of it. He describes the vacuum

(Testimony of William Howard Clapp)

process of making this chamber and it suggests at once the old Dewar flask turned upside down, somewhat foreshortened, conical sides, cylindrical bottom now, and a curved top. That was the form of the Dewar flask.

The problem is to put that flask, which would be made of sheet metal, on top of a housing for this cylinder, that housing being made in cast iron by any engineer of the usual procedure, and the figure as shown, I can reconcile the lines only on the premise that that is the relationship. I might draw a view as I see it, at right angles to this view.

The Court: Which one do you want?

Mr. L. S. Lyon: May I see the copy of the patent that is the official exhibit, if your Honor please?

The Court: I haven't got the official exhibit. This is my copy.

Mr. L. S. Lyon: Which is the official exhibit?

The Court: The one the clerk has.

The Clerk: The court reporter happens to have it now.

Mr. L. S. Lyon: I will have to get it.

The Court: This is the same.

Mr. L. S. Lyon: There is a space shown between there.

The Court: Yes; there is a space and that is what I was trying to find out about. There is a space shown here. Whether it is some kind of a platen or a seal across there [1261] I don't know, but there seems to be a space through here.

Mr. L. S. Lyon: If you put a magnifying glass on that, that is open at that point.

The Court: That is why I am asking about it. That seems to be.



(Testimony of William Howard Clapp)

Mr. L. S. Lyon: I do not believe the patent—the witness can correct me—but I do not believe the patent ever says there is a gas-tight communication between the two.

A. No; that is true; it does not. I don't think that Elworthy ever thought it was necessary. He was used to rigging up tubes. He has made provision for the saving of his carbon dioxide back to the system. He knows that he has made this tank so that it is capable of withstanding pressure. I don't think it ever occurred to him that anyone would think of permitting that gas to escape.

Mr. L. S. Lyon: The witness made one statement, your Honor, that I wonder if he could explain or illustrate. He referred to the piston and to the box. I wonder if he will tell us which parts on the drawing of the patent, which parts he calls the piston and which part he calls the box.

The Court: I am coming to that, because that bothers me. If there is going to be a closure there, there must be a head on that piston somewhere. I thought maybe this drawing might help us. Take your time, Professor.

A. I am thinking of how an engineer would start to solve that problem. (Diagramming on paper): Let that be the [1262] center line of the device as seen at right angles, thinking of this, now, as a conical circular member and this being the widest opening corresponding to this one in Fig. 1 at right angles—

Q. As being half the widest opening?

A. Yes. There would necessarily be a crosshead guide for a piston which would slide in here so that snow would not get under the thing, and then, as the usual operation, to guide it top and bottom. Now, looking at that in this direction, we have this line; we have that line;

(Testimony of William Howard Clapp)

we have this, and we have that, if it were shown in sections, but this line is not sectioned; this one would not be; if we were looking from the middle we would have the two lines, as shown, but it is partly in section, and I am going back to the fact that he was a chemist; that he was used to accounting for all of his material; that in his piping system it would be ridiculous to waste the gas.

Another possibility is this: That he was looking at it from the outside, and that he had sectioned it across this end, while this portion would be corresponding to the top closure of the piston at the right. Now, if he looks at it that way, and has made his section this way, on this second line, he would have this figure as indicated. He does not want the stroke here to be too long. He would have difficulty then in compressing the snow, and having to cut it off. He has the box filled with snow, and then withdraws it. [1263]

Mr. L. S. Lyon: I don't understand the witness, waving his pencil; I don't understand what he means by the box.

Mr. Foster: We will try to clarify that for you, Mr. Lyon, if you will save your questions for cross examination, with the court's permission, by having the witness mark the lines. May I, your Honor?

The Court: Yes.

Q. By Mr. Foster: Would you mark the lines on the flange you have drawn, upper and lower, as 1 and 2; then would you mark those lines in the patent that correspond to it, to which you have referred, on your sketch as 3 and 4 of the patent drawing. Will it be agreeable if that is done at the close of the session; if we insert those numbers on the original?

The Court: Yes.

(Testimony of William Howard Clapp)

Q. By Mr. Foster: What is the box at m, as referred to in that patent?

A. Here is a holding device against which pressure can be exerted.

Q. Will you give the holding device the number 5 on the patent drawing, Professor, and the box at m referred to by the patent, would you give that No. 6. I notice a thin little rectangle or element. You have marked 6 about the middle of it. What is that, according to your understanding?

A. It might be a handle, or a method of pulling out the box, which I take to be a mold of some sort. [1264]

Q. Would you give the handle referred to the No. 7, so the record may be clear?

Mr. L. S. Lyon: You referred to the box, did you, in your drawing?

Mr. Foster: I suggest, if the court please, that it would be proper order for Mr. Lyon to reserve his questions.

The Court: That is exactly what I want to know, where the head of the piston is; where the box begins; where the box ends; what there is between the box and the baffle 6.

A. You take the box as ending at what I shall mark as line 8, vertical line 8; the bottom of the box ending at the vertical line 9, the piston advancing at least as far into the box at the present time as it is capable of being retracted, until it opens the closure which now exists between the piston and the snow chamber.

Mr. Foster: Is the witness' description clear to your Honor?

The Court: Yes. I haven't studied this patent very much. I don't know where you get that, except by your

(Testimony of William Howard Clapp)

knowledge of engineering. Where is that talked about in this description, in the language of the patent?

Mr. Foster: Would you refer to the patent description?

A. Yes, the connection between the box and the snow chamber?

The Court: Yes, and the baffle.

A. The baffle 10? [1265]

The Court: Yes. I don't know whether you call it a baffle. It is the thing you exert the pressure against.

A. Yes, the box. There is no reference made to that.

The Court: There has got to be something to press against. A. Yes, and hold the piston in place.

The Court: You call it a baffle?

A. Yes. I would call 5, as we have marked it, a baffle.

The Court: A stop?

A. A stop. There is no foundation shown upon which this snow chamber and pressing chamber would rest, nor one for the pressing cylinder. That can be clearly understood. There is just the one view.

Q. By Mr. Foster: Would you, Professor, turn to the part of the patent description which describes the construction you have been illustrating?

A. Commencing line 22, page 4: [1266]

"f is the double-walled solidifying chamber, also vacuum-jacketted, the bottom of the chamber is preferably made tapering, or funnel-shaped as shown, and leads direct into a hydraulic press, the ram or platen of which compresses any snow formed, into the removable box at m."

(Testimony of William Howard Clapp)

Q. Would you refer also to page 6, Professor, if Mr. Lyon is finished with his use of your patent, beginning at line 5.

"The compressing apparatus is indicated in Figure 1, m being a receptacle, below the chamber f, into which the carbonic acid snow passes, and is very forcibly compressed into the receptacle by means of a pressure ram actuated by a hydraulic cylinder n, valves of the usual kind being provided by which water under pressure can be admitted into the cylinder n. When the snow has thus been compressed, the ram is withdrawn and the block of carbonic acid ice removed."

Mr. L. S. Lyon: Couldn't I get this?

Mr. Foster: Couldn't Mr. Lyon wait?

Mr. L. S. Lyon: I would like to get that now. I would suggest, your Honor, this is quite important. The witness has put these numbers, which have been mentioned in his testimony, on the copy of his own patent. I would like them to be put on the official exhibit before we adjourn, so they will be preserved.

The Court: I was going to ask the clerk to do that [1267] as soon as we got through this afternoon. It says here on page 4—

Mr. Foster: Mr. Lyon, would you let the witness refer to his patent while the court is calling his attention to it.

The Court: Line 25, page 4:

"The hydraulic press may however be entirely separate, and the snow being removed from the bottom of the solidifying chamber by any suitable means, may then be placed in the box, and compressed in the usual way. When the box at n is full, it may be removed and another be put in its place, and a slab of compressed snow may then be taken out."



(Testimony of William Howard Clapp)

Mr. Foster: If I may suggest, I think that sentence that the court first commenced to read should be read in the light of the preceding sentence.

The Court: Yes, he read that.

Mr. Foster: It is my understanding that the use in the sentence first read by the court, "The hydraulic press may however be entirely separate", is a suggestion of an alternative procedure.

The Court: That is right. Evidently this removable box at n has an open face exposed to the head of the hydraulic piston. A. That is right, yes.

The Court: He did not make much more intelligent a drawing that I would. [1268]

Mr. Foster: Before we leave that, may I suggest this: In the sentence preceding the one the court read, reference is made in the last couple of lines that the snow chamber leads directly into a hydraulic press, the ram or platen of which compresses any snow formed, into the removable box at m. It doesn't call the box m, and on page 6 m is referred to in line 5, m being a receptacle into which the carbonic acid snow passes for its compression. In other words m is the compression chamber, as I understand it, and the box is identified as being at m, but not m indicating the box.

Mr. L. S. Lyon: That isn't what the witness testified to, your Honor.

Mr. Foster: I think it is. I merely wished, before we left it, to call your attention to the fact that in the paragraph the court referred to the box is not identified as m, but at m.

The Court: I think it is a kind of distinction without a difference, isn't it? Actually, apparently he plans to

(Testimony of William Howard Clapp)

have a lot of these convenient boxes to use as a receptacle for applying pressure horizontally with this hydraulic ram, and you let the snow drop; that has to be opened at the top, and at the right-hand end, because the snow has got to drop in from the chamber f, hasn't it?

A. That is, the box has to be opened at the right-hand end, yes. [1269]

The Court: This receptacle has to be opened at the right-hand end to let the head of the piston press the snow. It also has to be opened at the top during the time that gravity is sending the material into it, doesn't it?

Mr. Foster: Yes.

The Court: So it is not a box at all, it is open on two sides, isn't it?

Mr. L. S. Lyon: No.

The Court: It is just a place? A. Yes.

The Court: And you pull that out?

Mr. Foster: May I ask the witness a question about your Honor's understanding of it, your Honor?

The Court: Surely. Maybe I have stirred up a mountain out of a mole hill, but I did not understand it; what I did not understand was the gas-tight phase of it.

Q. By Mr. Foster: As I understood what you stated with respect to this box shown at the left of the rectangle marked m, it was a box or mold having a bottom and four sides; is that correct?

A. Having a bottom and four sides; no top.

Q. And no top? A. Yes.

Q. And carbon dioxide snow would fall down from the chamber f into this space m, as it was compressed by the plunger moving through that space into this open topped box; [1270] is that correct?

(Testimony of William Howard Clapp)

Mr. L. S. Lyon: I object to that as suggestive. The witness has said this space marked m, ending at the line marked 8, on the drawing, is the plunger or piston. He was very clear about that, when your Honor was asking him.

A. The receptable is the space in which the plunger moves. In the position shown, the plunger is filling the space, and has pressed the snow into the box. The back end of the plunger is clearly shown as distinct from the receptacle which it occupies.

Q. Would you give the back end of the plunger, to which you refer, the next number?

A. No. 10.

Mr. Foster: I am afraid that was not clear, your Honor.

The Court: It is all clear to me. Now relaxed, this space is open so that the product may drop by gravity into the space m? A. Yes.

Q. The space m must be open at the top, must it not?

A. That's right.

Q. The space m must be open here to permit the head of the piston to come in contact with the mass of material, must it not?

A. No, as you see the position of the piston, when it [1271] has been moved to the right, the left-hand end of the piston, which might be represented by the line 8, if it is not in the box, has been moved over to some position, and to the left of the line 10, so that the piston occupies a position largely outside of the chamber, but not entirely, as it must be guided.

(Testimony of William Howard Clapp)

Q. But so far as the space is concerned, if there is any closure on the right-hand side it is done by the head of the piston, coming up to that point, isn't it?

A. It is done by the top of the piston coming to that point. I am thinking of this as a rectangular piston, pressing a block. May I change that line to bring it to conformity, your Honor, to the same level? Maybe that isn't quite center. Now, this is a circular opening at right angles to this drawing, which I have made, and when the piston comes back it will occupy some position near the edge of the circle, and will be in contact along the line of closure.

Q. But suppose we draw the head of this piston way back here, just to start this cycle, so you have a place there perfectly free to clean it out, or do anything you please, the first thing you do is to move the head of your piston up in elignment with this edge of the chamber, so as to make a closure here; isn't that right?

A. No, I don't see that the left-hand end of this piston, that face, ever moves outside of this chamber. [1272] It would occupy a position perhaps, as indicated by the dotted lines.

Q. You have got to keep this space open for the material to drop down to this space m?

A. That is right.

Q. So far as this space is concerned any closure on this side is the piston head, isn't it?

A. The top face.

Q. The top face of the piston?

A. Yes, making connection with the walls, as we had them on the other side. [1273]

(Testimony of William Howard Clapp)

Q. When that is full, that material is compressed, is it?  
A. That's right.

Q. And pushed into this box here, is it not?

A. That is right.

Q. Then the box is taken out? A. Yes, sir.

Q. By this little handle, and another one stuck in there, and you start all over again? A. Yes, sir.

Mr. L. S. Lyon: May I ask a question, your Honor?

The Court: Certainly.

Q. By Mr. L. S. Lyon: As you understand this drawing, is the bottom of this hopper, or flask, which you call circular, and if so, is the space m circular, or what space is it?

A. No, the bottom of the hopper is circular, and the space m underneath the hopper is rectangular.

Q. By the Court: As a practical matter it would not make a particle of difference whether the bottom of the chamber had been restricted to be angular to conform with the lower space, as long as it could be used; you couldn't have that space m rectangular and operate your ram?

A. I see no reason why not. Most of these pressing apparatuses use rectangular pistons.

Q. You couldn't have it circular or cylindrical; it would have to be rectangular, in order to make it operate?

A. Yes. [1274]

Q. It did not make any difference whether you dropped it in there in a circle smaller than the rectangular, or whether you squeezed the sides of the chamber to make it at the outlet conform to the shape of the rectangle?

A. Except you would have a better closure as the piston was withdrawn; it would occupy a position something as indicated there, but it would be closed on top.



(Testimony of William Howard Clapp)

Mr. L. S. Lyon: Your Honor, the point I have in mind is: This is a round throat at the bottom. We have got to have some kind of a rectangular receptacle there. I don't see from anything that has been said here how they could match.

The Court: Suppose you elongated this from square to rectangular, here is the outlet cylinder, if the outlet cylinder is within the edges of the rectangle, the material is going to drop in there?

Mr. L. S. Lyon: That is correct.

The Court: I imagine what they did was to flatten out the sides of the cylinder, and bottom, and made it rectangular and fitted it in.

Mr. L. S. Lyon: That is not shown that way.

The Court: No, it doesn't show.

Mr. Foster: One more question about that.

Q. Referring to Fig. 1 of the drawing of this chamber marked b, I notice the outer wall on each side of the chamber is a double line. Is that to indicate the thickness of the wall, as you understand it? [1275]

A. There is a covering over the outer wall to prevent heat flowing into the chamber.

Q. That is identified as No.—it isn't clear to me on my print. Is it No. 2?

A. I believe that is 2. It looks like p, in the drawing.

Q. Is that truly a sectional view? Should that wall be sectioned?

A. Yes, he says this is partly in section.

Q. But it isn't sectioned?

A. It isn't sectioned, no.

Mr. Foster: Does the court have any more questions on this patent?

(Testimony of William Howard Clapp)

Mr. L. S. Lyon: If we are going to leave that patent, may I ask the witness to hand the copy of the patent which he has marked to the clerk?

The Court: I guess you had better have Mr. Foster do it. He may know how to make the marks on the drawing, better than the clerk.

Mr. Foster: I will be glad to do it in the presence of Mr. Lyon.

The Court: Fix my copy up also. I will have it here.

Q. By the Court: That apparatus that you referred to is nothing but a liquefying apparatus for carbon dioxide, is it?

A. That is all. It is a cooling liquefying apparatus.

The Court: We aren't particularly interested in that, are we? [1276]

Mr. Foster: Only for this reason. During his testimony, in one of his answers Professor Clapp mentioned that the drawing, as he has explained it, of this pressing chamber m would be much more readily understood were the last two lines shown with section lines. I was calling attention to the fact that the other walls in the same apparatus, which were to indicate the thickness of the wall, were indicated merely by two lines, without hatching or cross-sectioning.

The Court: I understand.

Mr. Foster: The next patent is 1,546,681, issued 1925, to Slate, and is tab 15, of Defendants' Exhibit EE. Would you direct your attention to that patent, please, Professor Clapp, and explain what is there disclosed?

A. This patent discloses a method—apparatus for producing carbon dioxide snow, and it consists of a snow chamber marked 14, partly in section, which is closed with a closure head, consisting of a piece 12, a ring of com-

(Testimony of William Howard Clapp)

pressible material, to make a seal 13, and a threaded connection to screw onto the tank at the bottom. This is a well-known device for obtaining a seal, inasmuch as the pressure which is exerted on the top area must be borne by the smaller area in contact with the ring, and it is very effective. The threaded connection perhaps should be called attention to. It is what we call interrupted threads, where a portion of the threads have been cut away axially, so we can make a quick engagement. They are carefully made, and are used in [1277] breach blocks of guns, so that they can be easily broken and replaced.

Q. Those threads are shown in Figs. 2 and 3?

A. They are shown in Figs. 2 and 3. There is a pipe 4, connected through a valve 5, to some source of carbon dioxide, the carbon dioxide being illustrated with its outlet valve 3. There are also connections through the T to a compressor, one through pipe 15 as the inlet, and the other through pipe 19 as the exit. The method of operation consists in opening valves 3 and 5, letting the carbon dioxide flow from the tank marked 1, into the snow-forming chamber. I think that number is 8, and that I called it 14. —into the snow-forming chamber 8, until such a time as the pressure on the gauge shown at the top of the snow chamber, and marked 6, shows that we have liquid carbon dioxide in the chamber.

The valve 5 is then closed and material is returned through pipe 4 and 15 and the cock 16, to the compressor and out through pipe 19 to pipe 4, valve 3 being opened into the tank, from which it originally came. This causes rapid expansion and a drop in pressure, and a cooling of the tank, and this operation may be repeated until such time as we have accumulated sufficient supply of snow within the tank, when the valves are being closed and

(Testimony of William Howard Clapp)

the closure member 10 being loosened, the snow must be removed.

It is interesting to note here that this is a device entirely suitable for making triple point ice, inasmuch as [1278] it is abundantly strong; the pressures can be regulated by gauge. In fact, you can compress right in there; in fact you have a piston head 12, which, if you attach it by mechanical means, would compress the snow within the chamber.

To summarize, there is disclosed a snow-forming chamber, a closure lid or head, means for opening the chamber, a supply or inlet, an outlet for gas, this being the same, and used for the purpose alternately.

Q. The court may be interested, I think, in finding the exact place in the patent to which you refer, as indicated, the operations were continued until there was liquid carbon dioxide in this chamber 8.

A. Yes, beginning on page 1, line 91.

"The operation above described is repeated and the walls of chamber 8 become so cold from the previous filling and refrigeration that any gas that may enter the chamber is liquefied. As soon as the gauge 6 registers atmospheric pressure, the liquid carbon dioxide in chamber 8 has vaporized until the latent heat of vaporization has turned a portion of the liquid to ice or snow. As it turns to snow, the pressure may be completely removed and the carbon dioxide will remain a solid to be handled and used as the operator may choose."

Q. Read the next sentence too.

A. "The carbon dioxide snow, as it thus comes from the refrigerating chamber, is porous and light, but is then [1279] compressed by any suitable apparatus into

(Testimony of William Howard Clapp)

dense cakes of any convenient size to fit the requirements of the trade."

Q. Do you find on the same page, line 79, reference to the presence of liquid carbon dioxide in that chamber?

A. Beginning line 78:

"When the pressure gauge 6 registers the pressure that would indicate liquid in chamber 8 at the temperature of the chamber, the valve 5 is closed."

Mr. Foster: Does the court have any questions with respect to this patent?

The Court: This thing becomes, of course, much more simple after you get it going, and get this chamber very cold, doesn't it?

A. Yes. For that reason, I suppose he refers to alternately charging it, and withdrawing the carbon dioxide through the compressor, until a mass of snow has been accumulated.

The Court: No questions.

Mr. Foster: The next patent is that to Slate, 1,546,682, issued upon application filed January 10, 1924. Would you refer to that? It is tab 16, of Defendants' Exhibit EE. I will ask you to explain what is there disclosed.

A. This patent discloses a tank and snow chamber 22, and means for attaching it to a head 23, an inlet nozzle 24, for liquid carbon dioxide, an outlet through the pipe 28, which pipe is caused to surround the inlet pipe, so as [1280] further to cool the liquid gas.

The Court: What is the object of giving this the whirl, to get quicker action?

A. Well, I suppose he thought he would get much more rapid expansion and cooling, and Slate may have thought that he could use up energy in this way; that it



(Testimony of William Howard Clapp)

would be more efficient. In a later apparatus he uses a portion of the energy for driving it, helping drive the mechanism.

Q. In that connection would you read the sentence on page 1, line 68?

A. "The snow being heavier than the gas settles to the outside and bottom of the container by centrifugal force and by gravity. The gas being lighter than the snow collects in the higher and central portion and is forced to the position in the drawings by the whirling movement of the inflowing gas and escapes through the discharge pipe 28."

There should be a separation of the snow from the gas to some extent by that process.

Q. In the preceding Slate patent, you referred to the gas pipe connected to the top, No. 4, being used alternately as an inlet and outlet. That is not true of this Slate patent, 1,546,682, is it?

A. No, this patent shows a separate inlet and a separate outlet.

Q. If you will briefly summarize the disclosure.

A. To summarize, there is disclosed a chamber, snow-[1281] forming chamber, a closure lid head, and means for opening the chamber, a supply or inlet for liquid CO<sub>2</sub>, and an outlet for gas.

The Court: 22 is apparently removable, and you can stick another one on?

A. Yes, it isn't disclosed as to the exact construction. It infers that this intermediate piece is slipped over the bottom of the container, and comes up against a sealing head, at the top, and is then compressed and sprung slightly into the head, and that the bottom of the tank

(Testimony of William Howard Clapp)

rests on some support, and that head is heavy enough or that other means are used to withstand the pressure.

The Court: At that temperature they must have to insulate that tank pretty well at 22.

A. It certainly would be better, if they were running continuously. Of course, you can keep it pretty cool. I don't think it would be any trouble, except heat would flow in, and it would be less efficient.

Q. In connection with that, would you read to the court the sentence beginning on page 1, line 91, if you please? That is patent 1,546,682.

A. Beginning with line 86—

Q. With line 91. Page 1.

A. "The above described method of making the carbon dioxide snow may be used for making snow for various purposes by applying a removable chamber 22 to dome or converting [1282] chamber 23 and when filled this removable chamber 22 may be taken off and emptied and replaced for refilling."

Mr. Foster: I wish only to call the court's attention to the fact that after the application for this patent there was a division of the earlier application, as shown by the heading, January 10, 1924, serial No. 685,482, and that patent 1,546,681 was in identically the same manner a division of exactly the same application. I mention that, because the earlier Slate patent 1,546,681. is a smaller number, issuing on the same date, was the patent which, as Professor Clapp has read, taught in line 106, that the carbon dioxide snow could be compressed by any suitable apparatus.

(Whereupon an adjournment was taken until 10:00 o'clock a. m., Tuesday, May 23, 1944.) [1283]

Los Angeles, California, Tuesday, May 23, 1944;  
10:00 a. m.

(Parties present as last noted.)

Mr. Foster: If the court please, we have a new gauge and, with the court's permission, if Mr. Morris will look at it and see that there is no snow, we would like to have the workmen here to operate the model first.

The Court: I had another matter on and so I just happened to be on the bench. You want to do that now, do you?

Mr. Foster: I would like to while the apparatus is here.

Mr. Morris: Will Dr. Jones examine the apparatus?  
Mr. Foster wants to make another test.

The Court: I happen to have another matter on at quarter to twelve today and wonder if it would make any particular difference to you if we just go right on through until about twenty minutes to twelve, without taking a recess, with this understanding: That if the witness or anyone wants to take a short recess, just say so, otherwise we will go through until about twenty minutes of twelve and then we will make up a little time toward the latter part of the afternoon. If that is not inconveniencing you, it will be a great accommodation to me.

Mr. Foster: We will be very happy to do so.

Mr. Wilson, will you place the piston in the chamber and attach the top plate? [1284]

Mr. Wilson has placed the rubber gasket upon the top of the device and is now placing the top plate upon the model and is securing the top plate in place with four bolts.

The model has attached to that pipe near the bottom thereof, which has no pipe diametrically opposite, a tank of liquid carbon dioxide.

(Testimony of William Howard Clapp)

rests on some support, and that head is heavy enough or that other means are used to withstand the pressure.

The Court: At that temperature they must have to insulate that tank pretty well at 22.

A. It certainly would be better, if they were running continuously. Of course, you can keep it pretty cool. I don't think it would be any trouble, except heat would flow in, and it would be less efficient.

Q. In connection with that, would you read to the court the sentence beginning on page 1, line 91, if you please? That is patent 1,546,682.

A. Beginning with line 86—

Q. With line 91. Page 1.

A. "The above described method of making the carbon dioxide snow may be used for making snow for various purposes by applying a removable chamber 22 to dome or converting [1282] chamber 23 and when filled this removable chamber 22 may be taken off and emptied and replaced for refilling."

Mr. Foster: I wish only to call the court's attention to the fact that after the application for this patent there was a division of the earlier application, as shown by the heading, January 10, 1924, serial No. 685,482, and that patent 1,546,681 was in identically the same manner a division of exactly the same application. I mention that, because the earlier Slate patent 1,546,681. is a smaller number, issuing on the same date, was the patent which, as Professor Clapp has read, taught in line 106, that the carbon dioxide snow could be compressed by any suitable apparatus.

(Whereupon an adjournment was taken until 10:00 o'clock a. m., Tuesday, May 23, 1944.) [1283]



Los Angeles, California, Tuesday, May 23, 1944;  
10:00 a. m.

(Parties present as last noted.)

Mr. Foster: If the court please, we have a new gauge and, with the court's permission, if Mr. Morris will look at it and see that there is no snow, we would like to have the workmen here to operate the model first.

The Court: I had another matter on and so I just happened to be on the bench. You want to do that now, do you?

Mr. Foster: I would like to while the apparatus is here.

Mr. Morris: Will Dr. Jones examine the apparatus?  
Mr. Foster wants to make another test.

The Court: I happen to have another matter on at quarter to twelve today and wonder if it would make any particular difference to you if we just go right on through until about twenty minutes to twelve, without taking a recess, with this understanding: That if the witness or anyone wants to take a short recess, just say so, otherwise we will go through until about twenty minutes of twelve and then we will make up a little time toward the latter part of the afternoon. If that is not inconveniencing you, it will be a great accommodation to me.

Mr. Foster: We will be very happy to do so.

Mr. Wilson. will you place the piston in the chamber and attach the top plate? [1284]

Mr. Wilson has placed the rubber gasket upon the top of the device and is now placing the top plate upon the model and is securing the top plate in place with four bolts.

The model has attached to that pipe near the bottom thereof, which has no pipe diametrically opposite, a tank of liquid carbon dioxide.



Now will you proceed, Mr. Wilson? Mr. Wilson is opening the valve, inlet valve, for the liquid carbon dioxide. Pressure has been about 90 pounds since immediately after starting the operation. It fluctuated somewhat above 95 and is now at 90 again. The inlet has been open about one minute; one minute and 15 seconds; one minute and 30 seconds. The pressure remains at about 90 pounds gauge.

He has closed the valve at two minutes and 20 seconds. Mr. Wilson now opens the valve wide open in the top of the device and the pressure, as indicated by the gauge on the top, commences to fall.

Mr. Jones: The outlet line being partially plugged, discharged in an irregular manner during the blow-off time.

Mr. Foster: Mr. Wilson is now connecting the gas inlet in the bottom of the model to tank of carbon dioxide gas, not a liquid solid carbon dioxide, but in gaseous form. He is now opening the gas line to permit gas to enter. The pressure rose to about 600 pounds. He is now disconnecting the gas line in the bottom of the model.

Mr. Jones: I call attention to the fact that there was [1285] some liquid in the connection from the gaseous carbon dioxide cylinder, as shown by the discharge of snow.

Mr. Foster: Mr. Wilson is now removing the four nuts at the top of the model and removing the top plate and gasket.

It will be seen that in the inner cylinder there is a body of solid carbon dioxide.

Do you have a device to bring it out with?

He has removed the cake of carbon dioxide called the block of carbon dioxide from the device, and offered it to

plaintiffs' counsel and their experts for their examination. Just refrain from tearing it apart until the Judge sees it, Mr. Jones.

(Product produced by experiment exhibited to the court.)

Mr. Foster: The compressed block of solid carbon dioxide has been handed to the court for inspection.

Now, one other matter, if the court please, before we continue with the direct examination of Professor Clapp who was upon the stand at our last session.

Plaintiffs' counsel, as they have stated in open court, two days before the trial gave to defendants' counsel photostatic copies of some agreements that had been made by the plaintiffs, or one of them, which are related to the patent in suit. Inasmuch as they were given to the defendants' counsel with the request that the defendants admit the genuineness of the documents, we presume that the [1286] plaintiffs will have no objection to reference being made to them in this record and will not deny their authenticity. We do not think they wish to. And in order to conserve the time of the court and facilitate the presentation of proofs, we think they will admit that certain of these agreements were made effective as of certain dates and contain certain provisions and related to certain patents. Instead of placing representatives of the plaintiffs here in court upon the stand and going through the formality of examining them with regard to it, we have prepared a list of those facts which we think the documents clearly show and that the plaintiffs will be willing to submit. With the court's permission, unless the court objects to that manner of securing the facts most expeditiously, we think, we would like to have plaintiffs' counsel examine this list we have prepared.

The Court: Just have the matter considered over lunch and we will take it up this afternoon and find out whether it is satisfactory to them.

Mr. Foster: I will hand two copies to plaintiffs' counsel.

Professor Clapp, would you resume the stand? [1287]

WILLIAM HOWARD CLAPP,

recalled.

Direct Examination

resumed.

Mr. Foster: Did the court sufficiently observe the degree of hardness of the block that was made?

The Court: I noticed that when plaintiffs' expert pinched it at the side, that at that time it seemed to give way rather readily. Has it hardened somewhat since?

Mr. Foster: No, it is the same degree. If the court will observe it, pushing a pencil, or anything of that nature, on the bottom or side of the cake, the degree of hardness I think will be apparent. Your Honor will understand that with the pressure employed in pressing the block, as noted in the record, it is not nearly as great a degree of compression or pressure upon the piston as there would be in commercial operation.

Q. Professor Clapp, near the close of the session on Friday you were referring to a sketch which you made, which illustrated one manner in which this hopper and compression cylinder of the Elworthy British patent could be connected to the snow chamber.

I wish to offer that sketch when I can locate it. In the meantime I wish to ask Professor Clapp, have you caused to be made, under your direction, a drawing more clearly illustrating the construction to which you were referring at that time? A. I have. [1288]

(Testimony of William Howard Clapp)

Q. Would you produce it, please? I will ask the clerk to mark this sketch for identification as defendants' exhibit.

The Clerk: GG.

[Note: Defendants' Exhibit GG will be found in the Book of Exhibits at page 1563.]

Mr. Foster: I have handed plaintiffs' counsel a photo-static print, and I will hand the clerk another print for the use of the court.

I notice some pencil numbers upon Defendants' Exhibit GG for identification. Do those numbers correspond with the numbers which you placed upon the drawing of the Elworthy British patent, 7,436, during your testimony on Friday? A. They do.

Q. Would you give a brief explanation of the construction illustrated in Defendants' Exhibit GG with regard to the markings on that British Elworthy patent?

A. This construction represents an external view; what we call a side elevation, of a pressing chamber, a box 6 into which the material is compressed, and a circular opening into the pressing chamber, which he refers to as the receptacle m, that opening being represented by the lower and smaller of the ellipses on the top of the pressing chamber. There is also shown a similar possible rectangular opening. The patent states that the bottom of the solidifying chamber may be tapering or funnel-shaped, and leads direct into the receptacle at m, and is very forcibly compressed into the box at m. That, and the following statement that the hydraulic ram may be entirely separate. are the only [1289] statements in the wording of the patent that would show a direct closure

(Testimony of William Howard Clapp)

connection. For the rest we have to go to the relationships or context, of which I spoke.

This drawing shows the plunger in the receptacle. The forward end of the plunger, forward facing, that is, nearest the actuating ram, is shown flush with the front end of the receptacle m at the point marked 10. The point marked 8, which I have referred to as the front edge, vertical edge of the box, is also shown against the pressing chamber 9, in the rear of the box 6. Up next to the box, at 7, is a handle, or means by which it may be removed, and I should state that the box is resting on its edge with the front opening facing the receptacle at m. The lines which are shown on the drawing marked 1, 2, 3 and 4 would then represent the flanges on the box or receptacle, which would be necessary for an attachment of the solidifying chamber to the box. I do not say that this is the only way that the lines in the drawing might be interpreted. It would seem more logical to say that this is not a sectional view.

Q. Now, you are referring to the view of the British patent?

A. I am now referring to the view of the British patent. For in that case the space between the lines marked 3 and 4 should be shown in sections. Also the box certainly is not shown in section, and we see the handle on the outside, and the hydraulic actuating cylinder is not shown in section, so [1290] it seems to me more logical that this is to take the view that this is an external view of the compressing chamber.

Q. Professor Clapp, I notice that at the top of this sketch or drawing, Defendants' Exhibit GG, there are two sets of broken or dotted lines; one of them, rather light, is a dash line, the dashes being substantially of equal



(Testimony of William Howard Clapp)

length. Do I understand that that indicates the construction at the discharge opening into the pressing cylinder as circular in cross-section?

A. I am not certain that I get your question. Mr. Foster.

Q. Let me reframe it. I notice at the top of this drawing or sketch that there are two sets of broken or dotted lines. One of these sets is a set of dash lines, the dashes being of substantially equal length. Is my understanding correct that these dash lines indicate the construction which provides a circular opening for the snow to pass into the compressing chamber?

The Court: Do you mean into the receptacle m?

Mr. Foster: Yes, into the chamber that the piston reciprocates in.

A. Yes, the dash and dot lines represent an alternate method in case the openings were not circular, but rectangular.

Mr. Foster: Has the court any questions with respect to Defendants' Exhibit GG? I will offer the exhibit marked GG for identification into evidence as Defendants' Exhibit of the same letter. [1291]

The Court: It may be received for the purpose of explaining the testimony of this witness.

[Note: Defendants' Exhibit GG will be found in the Book of Exhibits at page 1563.]

Q. By Mr. Foster: I will ask you if this sketch, which I hand you is a sketch which you made during your testimony on Friday, with respect to the same patent. Professor Clapp? A. It is

(Testimony of William Howard Clapp)

Mr. Foster: I ask that this be received in evidence as Defendants' Exhibit HH.

The Court: It may be so received.

[Note: Defendants' Exhibit HH will be found in the Book of Exhibits at page 1564.]

Q. By Mr. Foster: Professor Clapp, in your testimony with respect to this Elworthy British patent 7,436. you referred to a box, to which you have applied the No. 6 in the sketch, as having an open top. In order that the record may be clear, do you mean that the top of the box, in the position in which it is illustrated in Defendants' Exhibit GG, of the drawing of the British patent, was open at the top?

Mr. L. S. Lyon: I think the testimony of this witness should be confined to what the drawing, as a drawing, shows, and the specification, as a specification, describes. This being a foreign patent the law is well settled that it is not effective for anything except what it actually describes in the written specification, or shows in the drawings. A foreign patent, which the witness admits is capable of different constructions, cannot be given a construction that will destroy the patent in this country. The question does not ask the witness what the drawing actually shows, or what [1292] the patent specification actually describes.

The Court: I think that is undoubtedly true as a matter of interpretation of a foreign patent. There was a little confusion in the testimony of this witness last Friday, because he did exactly what counsel did in his question: he confused the word "box", as a chamber in which the actual pressing took place finally, and the re-

(Testimony of William Howard Clapp)

ceptacle m, and he also confused the top and side of that box, because he seemed to say that the top of the box was open. Now, in this drawing, the top of the box is open, if you consider that it is lying on its side.

A. That's right.

The Court: The top of the receptacle is naturally open, because it must receive the snow, or the product of the apparatus, into the receptacle m, and this must be open, technically, on the near side of the baffle at the end of the hydraulic piston, or the piston that does the compressing, in order to permit that piston to fit in, that is true, is it not?

A. Yes.

The Court: In other words, so far as the receptacle is concerned, this baffle at the end of the piston is a part of the piston, and there is no barrier in the receptacle for the baffle to move if it came up ultimately to the point 8, is that true?

A. I am not clear as to what you mean by baffle.  
[1293]

The Court: What do you call this?

Mr. L. S. Lyon: A ram.

The Court: That is what you call a ram?

A. Yes; we referred to the stop against which the drawing showed that the box might have been pressed, as a baffle, the other day.

The Court: That's right.

Q. By Mr. Foster: Do you agree with the court's statements?

A. I do.

Mr. L. S. Lyon: May I call your Honor's attention, in connection with my objection, to the fact that I believe there has been a misstatement here, when we refer to a removable box as a separate receptacle. I call your attention to page 2 of the complete specification of the patent.

(Testimony of William Howard Clapp)

There are only two mentions of m in the specification. On line 25, which refers to a movable box at m, and then three lines down "when the box m is full." I think something is being read into this patent which is not there when we talk about a receptacle for the ram or snow, which is a separate thing from the box. The letter m is immediately below the throat of the snowing device. That is what you refer to as m, that is the removable box, according to the specification.

Mr. Foster: I don't agree. The specification reads, on page 6, beginning line 5:

"The compressing apparatus is indicated in Fig. 1, m being a receptacle, below the chamber f, into which the [1294] carbonic acid snow passes, and is very forcibly compressed in the receptacle by means of a pressure ram actuated by a hydraulic clinder n."

Mr. L. S. Lyon: There the same device is referred to as a receptacle, but never is there in the patent a statement that the part, where the witness marks the handle 7, is a separate part from the part marked m, and separably removable. If the whole part m were removed, the whole structure obviously would have to be different from the Exhibit GG. Where in the patent specification is there any statement that there is a separately removable box, separate from the part m? In fact the specification definitely states, line 28, page 2 of the complete specification, if your Honor has the complete specification—there is a preliminary specification, and then a complete specification. On page 2 of the complete specification, line 28:

"When the box m is full, it may be removed."

The Court: "When the box at m".

(Testimony of William Howard Clapp)

Mr. L. S. Lyon: Yes, "When the box at m". There has been an attempt to say that is a permanent receptacle, and the box is something over to the left-hand side, a separate part which is moved out by pulling the handle, of which this witness' drawing is made. I think the witness should be confined in his testimony, under the law, to what this actually shows; not what he can make out of it after knowledge of the art 50 years later. [1295]

Mr. Foster: We are content with our understanding of the nicety with which the English language is used in this patent, as distinguishing between a box at m, and the receptacle m referred to, and as remarked by the court. Has the court any further questions upon this patent?

The Court: I am not sure that I understand the position of Mr. Lyon. While we are here let us straighten it out. From a mechanical standpoint, Professor Clapp, as I was asking you on Friday, it would not make any difference whether the opening between the snow chamber f in Fig. 1, and the receptacle m were circular, square or rectangular, so long as it permitted the passage of the snow into the receptacle, that is true? A. Yes.

Q. Mechanically it would be exactly the same thing. Now, does it make any difference whether, when you pull at the handle 7, you pull out the box 6 separate and distinct from the closing face of the receptacle m, between the No. 8, and the No. 10? Suppose that from 9 to 10 that was a solid space, and the handle pulled the whole thing out, would that make any difference mechanically?

The Court: Let me ask one—

A. No; I don't see that it would.

The Court: Let me ask you one further question. By your interpretation of the patent, of Exhibit GG, you



(Testimony of William Howard Clapp)

force the ram to complete the pressing apparatus up to the Figure 8 or [1296] beyond toward the Figure 9 in order that you might remove the box by the handle, because if your ram only went, to exaggerate, half way back in the receptacle m toward the point h, you could not possibly pull it out of that separate box?

A. That is true.

Q. So if it were all one face and you pulled it out, then the whole thing would come out, wouldn't it?

A. Yes; and the whole thing could not be drawn out away from the paper with a plunger in the receptacle m.

Q. No; the whole thing could not be drawn out, but the face could be removed, could it not, and be pulled off, and then they could take it out by any means they pleased?

A. Yes; that is true.

Q. Let your ram go back, let the hydraulic plunger reciprocate, and then you just have an opening, don't you?

A. I think I should make myself very clear that this whole drawing is diagrammatic; it is not a detail; it does not show how the thing is constructed. One may infer from the context and the description as to how it might have been done, but one cannot say that that was the way Elworthy intended it to be done.

Q. All right. One further question. You could still have a box, could you not, by having, instead of only the box 6 removable, you could have box 6 and the sides and bottom of the receptacle m all attached together so that you could pull [1297] the whole thing out as a box by permitting the piston to pull the ram back to the point 10 or beyond and then pulling the whole thing out, couldn't

(Testimony of William Howard Clapp)

you? So it would not make any difference how far the ram had extended in the space from 8 to 10, would it?

A. No; I do not see that it would so long as the snow is compressed.

Q. Well, that would depend upon your timing, how much you let out and how much material you had to compress; if you had less, you would not get a full box, box 6 full; if you had more, you would get the box 6 full and you would have some extending outside, wouldn't you?

A. Yes.

Q. So, as a matter of fact it is more or less guess work just what Elworthy intended by his drawings and his specification, isn't it? You could conceivably make several different arrangements?

A. Yes, sir.

Mr. Foster: Is that all, your Honor, on that?

Q. You have referred on Friday to two Slate patents, 1,546,681 and 1,546,682. Will you next please direct your attention to British patent No. 237,681 to Slate for "Method of and Apparatus for Converting Carbon Dioxide into a solid"—that is Defendants' Exhibit EE, tab 28—and point out what is there disclosed?

A. Two views of the apparatus are shown in Figs. 1 and 2, [1298] and sectional views of part of the apparatus in the other figures to Fig. 8. Referring to Fig. 1, the No. 5 designates a snow-forming and pressing cylinder which is open at both ends but which may be closed at the bottom by a quick-sealing cap shown in sectional detail in Fig. 3. Slate employs the same device that he did in his first patent for obtaining a sealed closure, but has a method of opening this seal by having it mounted on a bell crank lever, which in turn is pivotally connected to the frame of the machine or an extension of the frame marked 10 by the pin 53. Referring to Fig. 5, an open

(Testimony of William Howard Clapp)

position of that sealing cap is shown with a block of compressed snow falling out. There is an inlet opening marked 34 on Fig. 3 by means of which the carbon dioxide liquid is brought into the cylinder through pipe 31, shown in Fig. 1, down alongside the cylinder and curving out to permit a valve 33 just before its entrance into the bottom of the cylinder. This valve 33 is mechanically actuated by a lever, or I might say a rod 36 and lever 37, being held normally in closed position by the spring marked 38. The arrangement is—well, perhaps I should describe the piston first.

In Fig. 3 a piston is shown—

Q. You are referring to what figure, Professor Clapp?

A. In Fig. 3 of the drawing, showing a sectional view of the bottom of the snow chamber, a piston is shown marked 18 and having sealing rings, so that Slate refers to the [1299] piston as a moving wall making a sealed connection or a closed connection between the bottom of the piston and the sealing cap.

Slate proposes to use the energy of the liquid carbon dioxide to do work on the piston, but he does not say that he expects it to do all of the work.

An outlet for the carbon dioxide gas that is formed is shown in Figs. 5 to 8 where, through openings in the top of the cylinder, the gas may pass out into a surrounding manifold marked 29 and be carried away by the pipe 30 which surrounds the inlet pipe 31, as described in the last Slate patent. The piston has connected to it a connecting rod 19 which, through a rather strange lever mechanism, is actuated or actuates a crank 26—another connecting rod 26, through the crank pin 25 and a crank arm. I judge from Fig. 2 that 25 refers to the crank as a whole,

(Testimony of William Howard Clapp)

the crank being keyed to a crank shaft 23 which carries a geared connection to a smaller pinion 50 on another shaft, which is turn carries a fly-wheel—

Q. By the Court: But all this complicated machinery over on the left-hand side of the cylinder in this Fig. 1 is just designed to synchronize the various phases of the operation, isn't it?

A. Yes. The intake lever or the lever which regulates the inflow of gas, No. 37, and its connection to the valve through the rod 36 is actuated by a pin marked 39 on the hub [1300] of the crank.

Q. By Mr. Foster: I think, if you will pardon the interruption, Professor Clapp, I think the court's point was this: That these various levers that go to make up the mechanism and the fly-wheels and so on are simply means of synchronizing the opening and closing of the liquid carbon dioxide valve and opening the closure at the bottom of it and converting the compressing cylinder at the proper times in the operation, is that correct?

A. That is the main function. Of course, they do absorb energy. As the piston is received by the carbon dioxide, energy would be stored in the fly-wheel and would be returned as more work was done by the piston.

Mr. L. S. Lyon: If your Honor please, I think I should state, so that your Honor will not dismiss from your mind or have the witness distracted from the subject, that this mechanism here is an inherent and necessary part of this device. It is not just a gas system or anything of that kind. This is what we look at as a perpetual motion machine, and we expect to contend—I do not know what the witness is going to testify to—if necessary, offer evidence to show that this device in its entirety is inoperative and is not a reference for anything.

(Testimony of William Howard Clapp)

I do not believe it was ever made to operate; and we contend it is inoperative. It has a lot of things that have not been described to your Honor yet that it has to do in order to work at all, and it has to do it [1301] through all this complicated linkage that you see.

The Court: That was what I was getting at in my amateurish way. If these things were not inherent functionally so far as the machine is concerned, I was not going to be very much interested, but evidently we have to go into it.

Mr. Foster: Have you completed your answer. Professor Clapp? Have you completed your answer?

A. I have.

Q. Have you completed pointing out the construction and operation of the device as described by this patent?

A. I was looking for a reference which may be in the American Slate patent. Taking up the operation of the device?

Q. Yes; if you please.

A. Referring to the Figs. 5 to 8, 5 shows a compressed block, the pressure on the sealing cap having exceeded the resistance on the toggle mechanism, causing it to open.

The Court: Well, let me see if I understand you. These Figs. 5 to 8 simply show the steps in the process or the cycle of the operation distinctly from all this mechanism over here to the left? A. Yes, sir.

Q. Now, tell me this: Could these same processes in the operation be accomplished by hand or by other arrangements than this complicated arrangement shown in Fig. 1?

A. They could be. In Fig. 6 liquid carbon dioxide under heavy pressure and temperature such that it is



(Testimony of William Howard Clapp)

mainly liquid [1302] is allowed to flow freely into the cylinder, after which it may expand, as shown in Fig. 7, and when the piston reaches the top of its stroke carbon dioxide gas flows out through the openings 28, after which the piston continues its downward stroke, compresses the snow and ejects the block.

Q. By Mr. Foster: Do you find a reference in the specification of this patent to the evaporation of carbon dioxide in liquid form within that chamber in the operations you have just described? My question is this. Professor Clapp: Do you find any reference in the specification of this patent to the evaporation of carbon dioxide in liquid form—

A. Yes, sir.

Q. —within this chamber in the operations you described in your last answer?

A. Page 3, commencing line 44: "At the instant that the sealing cap returns to the cam 39 operates cam lever 37 and link 36 to open valve 33 and allow liquid carbon dioxide to flow freely into chamber 5, forcing piston 18 upward by the pressure of the liquid carbon dioxide to about the position shown in Fig. 6, at which position valve 33 is closed". I think that covers it, does it not?

Q. Would you read the following sentence, too, please?

A. "the cam roller 39 having passed cam lever 37. Piston 18, which has already acquired momentum, continues on its upward path reducing the pressure on the liquid carbon dioxide which thereupon immediately boils, the liquid receding [1303] as it evaporates to supply gas which is expanding and following the piston 18 to the end of its path."

Q. In such an operation would triple point ice be produced within this chamber?

(Testimony of William Howard Clapp)

A. It could be; and I see on the same page, commencing with line 79: "In the process of refrigeration above described considerable portion of the liquid carbon dioxide is converted into a mass of light porous carbon dioxide snow, as illustrated in Fig. 7, while the remaining portion (about one-third) reverts to a gaseous state and is released as described through openings 28." A condition in which about one-third of the material was in the gaseous state would be at or very close to the triple point of the equilibrium diagram.

Q. Would you give a brief summary of this disclosure, please?

A. To summarize, there is disclosed a chamber and mold, a closure lid or cap, means for opening the chamber, an inlet for liquid carbon dioxide, an outlet for liquid carbon dioxide, an outlet for carbon dioxide gas, a pressing plunger and means for operating the plunger.

Mr. Foster: Does the court have any questions on this patent?

The Court: No; I do not believe so.

Q. By Mr. Foster: As I understand you, Professor Clapp, the formation of the carbon dioxide solid and its compression [1304] into a compressed block takes place in the same chamber in accordance with the disclosure of this patent, is that correct?

A. It does.

Q. Will you direct your attention to another Slate patent, 1,643,590, which is Defendants' Exhibit EE, tab No. 18, and since the drawings, Figs. 5 to 8, simply appear to resemble those which you have described in the British patent, will you point out what is different from or added to the disclosure of the British patent to which you have just referred?

The Court: What is this number?

(Testimony of William Howard Clapp)

Mr. Foster: That is 1,643,590, your Honor, tab 18.

A. The description of the apparatus is practically identical with that given in the previous patent. There was one question which one might ask as to whether, with the outlet for the gas at the very top position of the bottom of the piston, that gas would escape completely enough so that on the down stroke one would not be compressing gas as well as snow.

The Court: That was the thing that I was hesitating about.

A. In the American patent, commencing with line 97 on page 3: "The phrase 'reducing pressure in the chamber' as used in the succeeding claims is to be construed broadly as applying to any operative method and means for relieving or [1305] reducing the pressure on liquid carbon dioxide supplied to a chamber under pressure, whether by utilizing the energy of the expansion of gas from the liquid in a pressure chamber to drive or to continue to drive a movable element such as a piston and thus increase the capacity of such a chamber or whether by other means (not illustrated) for releasing or reducing pressure in the chamber into which the liquid carbon dioxide is conducted under pressure, such as a valve controlled passage adapted to be opened to allow the portion of the liquid carbon dioxide which vaporizes to escape rapidly from the chamber while the remaining portion is refrigerated to snow."

As I understand that last statement, that means we might have an opening or openings spaced anywhere along the length of that cylinder and not necessarily at the very top for the exit of the gas.

Q. And would you add to that portion you have read by reading claim 1 of that patent, please?

(Testimony of William Howard Clapp)

A. "A process for converting liquid carbon dioxide into a solid for refrigeration and other purposes, consisting in conducting liquid carbon dioxide into a chamber under sufficient pressure to cause it to remain a liquid while being admitted; reducing the pressure inside the chamber and thereby converting a portion of the liquid carbon dioxide into a snow-like condition; withdrawing the carbon dioxide which has reverted to a gas; and compressing the carbon [1306] dioxide snow into a compact dense mass."

Q. And the whole disclosure of this patent, as I understand your testimony, is to the effect that the carbon dioxide shall be converted to a solid and compressed into a dense block within the same chamber?

A. That is right.

Mr. Foster: The court will note the date of the application is June 10th, 1924. Are there any questions on this patent, your Honor?

Q. By the Court: Well, about the only difference between this American patent of Slate and the disclosures in this British patent, then, is that he is not so keen for this arrangement of the piston 18 and the sealing rings, moving wall and sealed construction using energy of the carbon dioxide to do work on the piston. He kind of hedges on that and thinks that the thing to do is to leave it open to let the gasified carbon dioxide escape; isn't that true?

A. Yes, sir.

Q. This is a cumbersome arrangement in this British patent for the escape of that gas. Would it work?

Well, I guess I am anticipating something. You can wait until cross examination.

Mr. L. S. Lyon: Yes; I think so, your Honor. And I might state, while your Honor has it in mind, that we

(Testimony of William Howard Clapp)

do not agree that the patent describes putting any holes down below the piston. [1307]

The Court: You mean in the Slate patent?

Mr. L. S. Lyon: In the Slate at all, in the American or the British; and if you did, you would never get your piston driven up to the top. There is no other provision shown except this perpetual motion arrangement.

The Court: That is why I asked him whether it would work. I wondered how, under the disclosures of the patent, you could make that work.

A. Well, I do not find in this patent any place that he intends to.

Q. You are speaking of the British patent now, are you? Are you speaking of the British patent?

A. I do not find in the British patent in any place that he intends to operate this mechanism solely from the energy derived from the expansion of the carbon dioxide gas. I do not see any reason why he might not put a belt on the fly-wheel and drive it with a geared motor, slowly, utilizing the energy that he can, effectively, returning it from the fly-wheel to the pressing operation and still have a controlled operation.

Mr. L. S. Lyon: May I ask—

Q. By the Court: In other words, you do not think the fact that he may have devised some kind of a perpetual motion arrangement interferes with the fundamentals of his apparatus; that he did not need to do that to accomplish the purpose of making these blocks; is that your point? [1308]

A. Yes, sir.

Mr. L. S. Lyon: I do not understand the witness testified that the patent anywhere discloses putting a motor on.

The Court: No. I think he said it did not.



(Testimony of William Howard Clapp)

The Witness: No.

The Court: That it could, however, be done. Well, let us let that go until cross examination.

Q. By Mr. Foster: Would you direct your attention next, Professor Clapp, to patent No. 1,631,037, which is tab No. 17 of Defendants' Exhibit EE, on an application filed in October, 1921, and point out what is there disclosed?

A. Fig. 1, your Honor, shows a rather formidable machine, but the elements are relatively simple and are shown quite clearly in the detailed drawings from Figs. 2 to 7.

The Court: What number is this?

Mr. Foster: 1,631,037, your Honor.

The Court: I had a little mechanical operation I wanted to take care of.

Mr. Foster: It is tab 17.

A. This is a machine for pressing boiled garbage. The garbage is brought down into the top of a pressing cylinder marked No. 4 from bins or receptacles A or B, through pipes marked 22, and there are control valves 24 for permitting the material to enter at the top of the cylinder 4 from either side at will. A good view of the pressing cylinder [1309] is shown in Fig. 7. There is shown also a closure cap which may be let down on the top of the cylinder, this closure cap being marked 12 and shown in full outline in Fig. 6; and it will be seen that the larger annular area of that cap fits on the top of the cylinder, as is shown in Fig. 1, where a small part of that closure cap is shown sectioned. This cap is provided with multiple apertures which connect with an annular groove 31 in the cylinder 4 by means of which liquid

(Testimony of William Howard Clapp)

which escapes from the top of this mass may be withdrawn through pipes shown as 33 and 34 in Fig. 1. This cap is hydraulically actuated by a cylinder—through a cylinder and piston marked 10 and 11, respectively, shown in Fig. 6. There is also shown a partial enclosure or fence in Fig. 2 marked 21 which is actuated by small cylinders—I think those are 41—placed on either side and above the gate. This gate prevents the material which is allowed to flow in under the closing cap from escaping and directs it into the top of the cylinder 4.

There is shown a pressing ram marked No. 3, which likewise is perforated on its upper face, carrying a perforated plate marked No. 5, and means are provided by which the liquid which escapes at the bottom of the material may flow out through openings 35 in this ram and be withdrawn through openings in the end of the cylinder marked 36 to pipe 38, as shown clearly in Fig. 7. This piston is hydraulically actuated, as shown in Fig. 1, through a cylinder 1 and an [1310] actuating piston No. 2.

The method of operation consists in raising the closure cap, lowering the side gates, opening the valves 24 in filling the cylinder 4 with material, closing the closure cap and pressing against that cap with the ram No. 3, after which the operation may be continued, the ram 3 and the closure gate 12 rising together for the ejection of the compressed material.

To summarize, there is disclosed a chamber and mold, a closure lid, means for opening the chamber exit, means at the top and bottom for the escape of fluid and any gas in the material, and a pressing plunger hydraulically operated acting in the chamber.

(Testimony of William Howard Clapp)

Q. By Mr. Foster: Referring to Fig. 2, Professor Clapp, I notice that there is a piston 58 just above that pressing plunger 3 when it is in the uppermost position. What does the patent describe as the purpose of that piston 58 and cylinder 59? Do you find it?

The Witness: May I get that question again?

(Question read by the reporter.)

Q. Do you find the piston, Professor Clapp?

A. I am not sure that is the one that you refer to. Oh, yes. That is a means also shown in one of the previous patents to use a ram to thrust the material one side after it has been ejected.

Q. In other words; as the compressed block of material [1311] is raised upon the pressing plunger, as the closing head is moved from its chamber-closing position, then this hydraulic ram operation pushes this compressed block off of the plunger, is that correct?

A. Yes, sir.

Q. If in this apparatus of the patent an inlet is provided for the supply of liquid carbon dioxide, would it be adapted for the solidification of carbon dioxide by expansion and the compression of solid carbon dioxide into blocks? A. It would.

Q. That solidification of carbon dioxide and its compression into blocks taking place in the same chamber?

A. Yes, sir.

Q. Would you next direct your attention to patent No. 1,659,431 of Josephson—which is tab 19, your Honor, of Defendants' Exhibit EE—and point out what is there disclosed? [1312]

A. Josephson describes a method for freezing liquid carbon dioxide directly to ice, while under sustained pres-

(Testimony of William Howard Clapp)

sure, very great pressure. He says that he has noticed that liquid carbon dioxide, as distinguished from water and most liquids, is very highly compressible, and states, page 1, commencing line 62, that under a liquid pressure of 150 pounds to the square inch, the ice will have a specific gravity practically the same as that of water. That would be about  $62\frac{1}{2}$  pounds per cubic foot, "whereas the same method with the pressure kept up to 850 lbs. to the square inch will give a density of 86 lbs. to the cubic foot, and with sufficient pressure, say, somewhere between 1500 and 2500 lbs. per square inch, the density of the ice can be carried up to 95 lbs. or even 100 lbs. or more per cubic inch." The entire layout, which is shown in this figure, the only figure, is diagrammatic, and more elaborate in the treatment for reducing temperatures than we have seen in any other of the patents, there being water and brine, ether, coal, nitrogen gas, and other things possibly, used in the cooling of the material.

If we may start with the liquid coming out of the last counter-flow condenser, through a pipe 38, and going through a manifold, through a valve 62, the manifold being 39, and being allowed to flow into these pressing chambers, under a pressure of from 50 to 60 atmospheres, and a temperature of about minus 50 degrees Fahrenheit, the chambers are shown here as 41, the inlet pipe as 40, and valves connecting each chamber as 40-a.

Means are provided so that liquid carbon dioxide can escape at the top of the chamber through pipes with valves marked 51, going to the manifold 53, where they may be returned to the system, or used to cool the incoming gases. These cylinders 41 are described as having closure caps of the quick sealing type, that is, of the breech-block type of interrupted thread mechanism, which

(Testimony of William Howard Clapp)

closes the bottom of each cylinder, and are actually diagrammatically illustrated. The material which enters the chamber is further compressed, after any gas has been allowed to escape, and the cylinder is full. In the manifold entrance to these cylinders a valve, 62, is shown, and directly under the valve is a pipe connected with a small high pressure piston at the cylinder marked 60, which has an inlet through a valve marked 61, above the valve 62, an exit into the manifold below 62, so that when the cylinder has been filled with liquid at from 50 to 60 atmospheres, valve 62 is closed, the plunger in 60 is started, valve 61 is opened, and material is withdrawn from above the valve, and delivered below the valve, to bring the pressure up somewhere in the neighborhood of between 1500 and 2500 pounds.

The medium which surrounds these chambers is described as ether, or other suitable material, which is cooled in very cold nitrogen gas, described as being from 200 to 300 degrees Fahrenheit below zero, so that the material is [1314] frozen under what he calls a sustained pressure. The patent also states, page 3, commencing at line 24:

"It will be evident that while I have shown one apparatus whereby my method may be practiced, the desired constant or follow-up pressure may be applied in other ways, as, for instance, by pistons forced downward upon the liquid in the ice chambers 41 after the chamber has been filled and cut off; the removable breech-blocks may be held in any desired way as, for instance, by hydraulic pressure; and the freezing refrigerant may be supplied by any suitable refrigerating machine instead of by the expanded nitrogen product as above described."

The Court: What does he mean, for instance, "by pistons forced downward upon the liquid"?



(Testimony of William Howard Clapp)

A. Your Honor, I take it, that instead of using the means which he has shown there which axially seal the high pressure cylinder 60, that he might have this follow-up pressure by use of the pistons in these cylinders.

The Court: It would not be liquid at the time that action was applied, would it; it would be solidified or gasified?

A. No, it was the interpretation that I got from the patent that he intends to run this liquid in at a pressure of 50 to 60 atmospheres, withdrawing any gas that might be present, and then immediately boosting the pressure up by closing the valve 62, opening 61, to 1500 or 2500 pounds [1315] per square inch, holding it in what he calls sustained or follow-up pressure until the material has solidified.

Mr. Foster: The first sentence in the patent, I think, will help your Honor.

The Court: You mean the first starting "My present invention"?

Mr. Foster: Yes, the first sentence in the first paragraph.

The Court: That was what I meant, yes.

Q. By Mr. Foster: You referred, Professor Clapp to an inlet in each of these cylinders 41 for supplying liquid carbon dioxide thereto; then you referred to this outlet valve 51 in the pipe 50. Is it in accordance with the teachings of this patent to withdraw carbon dioxide gas through that pipe 50 and valve 51?

A. Yes, if any is present.

The Court: I wish, Doctor, that you would run through this briefly again. I had not read any part of it before, and did not understand it. I couldn't see how the thing was going to work. Maybe with this first sentence

(Testimony of William Howard Clapp)

I may understand it. It was entirely unintelligent all the way through; I did not understand it.

A. If I may start with the liquid carbon dioxide under a pressure of 50 to 60 atmospheres, minus 50 Fahrenheit, flowing through the pipe 38, valve 62, manifold 39, and being distributed through inlets through pipes 40 into each [1316] of these six solidifying chambers and to exit pipes shown alongside the inlet pipes, and the valve marked 51, through which the gas, should any form during the running in of the liquid, may be removed and returned to the system through the pipe 53?

The Court: Each of the chambers has its own valve?

A. Yes. Then after a chamber has been filled, a further boosting of the pressure by closing the valve 62.

The Court: You do not need to go any further. I have caught up with myself.

Q. By Mr. Foster: Will you briefly summarize the apparatus disclosed in the patent, please?

A. To summarize, there is disclosed a chamber, a mold, a closure lid, means for opening the chamber, an inlet for the liquid carbon dioxide, an outlet for the gas and an alternate method, a pressing plunger working within the cylinder, and means for operating the plunger.

Q. You referred to the breech-block type of closure for each of these solidifying and compressing chambers, 41. Is it correct that that is a type of closure, well known in the art, for providing a gas-tight seal for the walls of the chamber, and permitting rapid opening and closure of the walls?

A. Yes, as is shown in a number of the patents.

Q. And it is used in the mechanical art, in a great variety of devices, where a good seal and a rapid opening [1317] are required?

A. Yes.

(Testimony of William Howard Clapp).

Q. In this patent to Josephson, solidification of carbon dioxide and its compression into blocks, takes place in the same chamber? A. Yes.

Q. Would you direct your attention, please, to patent No. 1,659,434, issued in 1928 to Martin, and point out what is there disclosed?

A. The Martin patent has for one object the recovery of as large a part of the carbon dioxide snow, which is produced, as is possible, and means for preventing it being swept away into the exhaust and melted. For this purpose he uses a relatively large snow chamber, which he describes at  $2\frac{1}{2}$  by 3 feet in diameter, and  $3\frac{1}{2}$  by 4 feet high. Affording ample space for quite an expansion.

Mr. L. S. Lyon: If your Honor please, I think I should object to testimony on this patent under the rule that two experts cannot interpret the same patent. This is cumulative. Mr. Martin himself has discussed this patent. I don't see how this witness, as an expert, can help your Honor, after you have heard from the man himself who is the patentee explain the patent.

Mr. Foster: Mr. Martin's reference to it was only as an illustration, a drawing, which was the drawing of the device, the subject of his testimony, as prior use, prior [1318] invention. If it involved any invention, it was not as to the text of the specification. The reference to the patent will require only a very few minutes.

The Court: My recollection of it is that Martin's testimony was a bit sketchy. Let us try to avoid any duplication, and if there is duplication we can take it subject to a motion to strike.

Mr. Foster: Continue.

(Testimony of William Howard Clapp)

The Court: As I remember, it had no gauge for the pressure, and it was somewhat guesswork, by the amount of gas escaping from the apparatus.

Mr. Foster: I think probably the witness can answer that better.

The Court: There was a safety valve into the outer cylinder? A. Yes, there was a safety valve.

The Court: And it couldn't always operate, because it froze up?

Mr. Foster: I think that is true of any outlet valve to the carbon dioxide tank.

A. We have a safety valve on the Stastiney device. It hasn't frozen up.

The Court: It kicked up a little the first time.

Mr. Miketta: I think this patent is also shown in the exhibit introduced by the plaintiffs, Plaintiffs' Exhibit No. 6, in connection with Dr. Jones' testimony. [1319]

Q. By Mr. Foster: Will you continue with a brief discussion of this patent?

A. The cylinder is a double cylinder, with a jacketed space provided between the walls, and the top of the inner cylinder or snow chamber proper is covered with a screening device, reinforced on either side by a galvanized wire mesh screen, which he describes as about three-mesh, being very rigidly attached through suitable angles and clamps to the periphery of the inner cylinder.

There is a closure door marked 29, which the construction shows to be let in through both the outer and into the inner cylinder, the door frame, if we may call it that, 30, being described as welded to both members, and clamping devices are indicated through 6, and screw 6a, by means

(Testimony of William Howard Clapp)

of which the door may be released from its closed position. The inlet for liquid carbon dioxide is shown in Figure 3, and through the door, near the bottom, the idea of the patent being to get a relatively large space into which this gas may be allowed to flow and expand without interference from external sources of friction, so as to obtain as rapid cooling as possible. While snow builds up on the screen, and may entirely clog it, by rapping on the cylinder it is, of course, dropped down. There is an outlet for the carbon dioxide gas, as shown by a dotted circle in Figure 3, near the bottom of the outer cylinder, and also indicated in Figure 1 by the outlet connections marked 11, 12, 13, and [1320] so forth, these connections being made of a construction which would allow swiveling of the pipe, because the plan was to set this dotted cylinder on platform scales, and when a great amount of snow had been accumulated to shut off the inlet and stop the snowing.

Q. That was for the purpose of preventing the filling of the device with a quantity beyond the limit regarded as safe, and to terminate the filling, regardless of the internal pressure?

A. That is true. I was a little bit curious to determine what the capacity of the device might be, under the assumption that it was a 30-inch cylinder—

Q. I think that is on page 1, lines 35 to 40.

A. Yes; that it was a 30-inch cylinder, and  $47\frac{1}{2}$  inches high, which I got by measuring the height on the basis of the scale given by an assumed diameter, if it were completely filled with snow. Page 2, commencing line 28:

"In the apparatus shown, 400 pounds of snow is about as much as is safe to accumulate in one run, since ma-



(Testimony of William Howard Clapp)

terially greater amounts will result in clogging the whole apparatus."

And of this 400 pounds, so as to completely fill the chamber, it would have a density of weight of about 16.3 pounds per cubic foot, whereas, if it filled a chamber two-thirds full with suitable material, logically it would weigh three-half times as much, or about 33.4 pounds per cubic foot. [1321]

\* \* \* \* \*

Mr. Morris: I understand the admission of genuineness now applies to all the documents which we submitted to them, and particularly—if I may use "particularly" with any such sense—to the licenses and sub-licenses exhibited to counsel; that is, I understand their admission of genuineness is not confined to the documents referred to in today's request for admissions.

The Court: No. No; my understanding of it, they were all combined in that black book you have there and that those were the ones submitted to them, and you vouch for the authenticity and they accept your vouching and raise no question as to the authenticity.

Mr. Miketta: That is correct, your Honor.

Mr. L. S. Lyon: And therefore the plaintiff admits each of the requests that were served this morning, the answer to each of those requests is in the affirmative.

The Court: Very well. Let this, then, be filed and let the clerk make a record of this document at this time, that plaintiffs admit the answers are affirmative to all of those requests. And that save a lot of time.

Mr. Foster: Thank you, your Honor. May we proceed with the Professor?

The Court: Yes. [1325]

WILLIAM HOWARD CLAPP,

recalled.

Direct Examination

resumed.

The Court: Now, let's see where we were.

Mr. Foster: Professor Clapp was referring to the Martin patent 1,659,434, which is tab No. 20 of Defendants' Exhibit EE.

The Court: I remember now.

Mr. Foster: And he had, just before the noon recess, referred to the quantity of snow formed in that snow chamber of that patent.

Q. Now, would you continue with your description of what is disclosed in that patent, Professor?

A. I believe I covered the inlet, the outlet,—

Mr. Foster: Yes.

A. —and position of the safety valve. Some question of—on the assumption that the tank held 400 pounds of snow, which is described in the patent, and that it might be full or two-thirds full, what the density of that loose snow might be, I made some calculations on the strength of the outer chamber. Assuming, within the dimensions given in the patent, a diameter and taking on the measurements of the drawing, which I understand is not reproduced exactly to scale, the thickness and height, etc., and I find that the upper cover marked 41, reinforced with channels spaced, as near as I could, at the distances apart shown in the drawing, that that cover, when pulled securely around the outer flange, [1326] is adequate to withstand an internal pressure of 100 pounds per square inch, using the same factor of safety that is used in boiler construction, that is, using a factor so-called of 5,

(Testimony of William Howard Clapp)

which would mean that the maximum stress would not exceed one-fifth of the rupture stress of the material.

The bottom member is even stronger, as it has two steel plates, one for the bottom of the inner tank, one for the bottom of the outer, the latter being preferably spot-welded to the channel. With regard to the screen, the dimensions and proportions generally do not furnish enough information upon which an intelligent calculation can be made. If the screen were kept in a tight drawn position, the stresses would be very much greater than if it were allowed to bow out and make something of an angle with a horizontal plane at the point of juncture with the line of the inner cylinder.

I did make some calculations on the assumption that it was given, as, I believe, 4 mesh. Yes,  $\frac{1}{4}$ -inch mesh, which would be three openings per inch. Assuming one-eighth inch diameter in both the inner and outer wall protection under that filter cloth, there would be required an angle there at the juncture of some 12 or 15 degrees in order to withstand a pressure corresponding to the so-called triple point.

Q. Would you briefly summarize the disclosure of this patent?

A. To summarize, there are disclosed a snow chamber, a [1327] door for access to the chamber, means for opening the door, an inlet for the liquid carbon dioxide, and an outlet for the carbon dioxide gas.

Q. Professor Clapp, would you turn your attention to Martin patent 1,659,435, which is tab 21 of Defendants' Exhibit EE, which application was filed December 7, 1926, and point out what is added to the disclosure of the earlier Martin patent by this patent, and in that connec-

(Testimony of William Howard Clapp)

tion would you first read the very first paragraph of the patent?

A. "My present invention concerns large quantity production of solidified carbon dioxide in the form of so-called carbon dioxide snow and compression thereof to form dense, structurally coherent blocks such as are now going into extensive use for refrigeration and similar purposes."

Martin tells of the advantage of what he claims as a fact, that if the liquid is cooled until below its critical pressure, then a much greater quantity of such can be produced, as described on page 1, commencing line 41; and Martin endeavors to create a long chamber with the inlet at one end.

Q. What is the number of the inlet?

A. A long chamber, inner snow chamber, being No. 10, with an inlet marked 17, the nozzle controlled by a valve 18, from a source of liquid carbon dioxide; and he endeavors to provide a quiet space into which this material may freely expand and cool without interference, so as to get the [1328] maximum cooling effect due to the separation of the molecules of the gas.

The waste gases from the snow chamber escape at a screen in the upper part of the right-hand end of the snow chamber in Fig. 1, marked 23. They are allowed flow around the outer walls of the snow chamber; in the jacket space, there is a baffle or division 26 which prevents the outgoing gases going directly into the exit No. 11. Martin describes a snow nozzle, as shown in Fig. 2, described at page 23, line 90, with a Venturi-shaped opening, which engineers will recognize as, when being properly proportioned, will permit of expansion of the material with the



(Testimony of William Howard Clapp)

least amount of frictional resistance, his idea being as expressed on page 4, commencing line 5:

"The preservation of the liquid cone and further increase of snow yield is promoted by having the snow tank, 10, into which the nozzle discharges. For expanding, say, 1000 lbs. of liquid per hour, it may be 20 feet long by 4 feet in diameter."

The snow chamber is shown as inclined, as he states, on page 4, line 45:

"The snow chamber is shown as inclined for the purpose of facilitating clearing out of snow at the far end of the chamber, in a bin, 24, to which access may be had through a door, 25."

Q. Would you read the next sentence too, Professor?  
[1329]

A. "The snow chamber may be and preferably is, provided with agitating scrapers for clearing the snow that collects on the inner surface of shell 10, as described in a companion application of even date herewith, and the exit, 25, may be the path of movement of a compressor as shown in said companion application."

To summarize, there are disclosed a chamber, a closure door, which would probably be manually operated, an inlet for liquid carbon dioxide, an outlet for carbon dioxide gas, and some sort of a compression means which might be exerted along the path of exit of the collecting chamber 25.

Q. For the presence of this pressing plunger, as set forth in the chart you prepared, Defendants' Exhibit FF, you are referring to the statement you read on page 4 that the outlet of the snow chamber may be in the path of movement of the compressor, is that correct?

A. Yes, sir.



(Testimony of William Howard Clapp)

Mr. Foster: Does the court have any questions on this patent?

Q. Will you, somewhat out of order, refer to Martin patent, another patent to Martin, 1,887,692, which is tab 24 of Exhibit EE, and point out what is there added to the disclosures of these prior Martin patents?

A. The patent states:

"It is related to the invention set forth in the companion application, Ser. No. 153,064, now Patent No. [1330] 1,659,435. granted February 14, 1928, in that it concerns large quantity production of solidified carbon dioxide in the form of so-called carbon dioxide snow and compression thereof to form dense, structurally coherent blocks such as are now going into extension use for refrigeration and similar purposes."

Beginning page 1, line 33:

"My present invention relates more particularly to means for compressing the snow into blocks, preferably in an extension of the extremely cold snow-forming chamber whereby loss of the carbon dioxide gas is minimized, and the snow is preserved in the cold atmosphere, insulated from heat until after it has been compressed into blocks,"

Q. Will you complete the sentence?

A. "in which form it is in relatively stable condition for extrusion into the open air for use as a finished commercial product."

He describes tamping means, which are illustrated in Fig. 1, which the patent states may be operated either manually or by some form of machine power.

Fig. 1 shows the collecting chamber, the tamps marked 30 and a means indicated for their reciprocation. In Fig. 2, a sectional elevation of chamber 20 is given, into which

(Testimony of William Howard Clapp)

the snow enters at right angles to the plane of the paper, and drops in front of the plunger 22. In the left-hand view the plunger is shown in full sectional lines as being retracted [1331] and opening from the hopper 20 into the pressing chamber, and is unobstructed, while in the right-hand view the plunger has moved over to a position shown in the dotted lines, with a block of compressed snow at the dotted vertical line there crossed by the dash on Fig. 22.

There is also shown a lid or cover, which is shown as being advanced with the piston in some way, although the cover has proceeded further than the piston in its stroke, and in this position has closed off the opening, while the plunger has possibly completed its stroke. The patent states that for the purpose of holding a pressure against which the plunger operates, page 1, commencing line 92: [1332]

“Preferably, one formed block serves to sustain the thrust of the piston on the next block, and the piston acts both to form and eject blocks.”

Also, page 2, commencing line 49:

“For compressing the first block, a plug or other abutment must be used to sustain the pressure of the plunger against the snow, but thereafter the first block, x, may be pushed to the position x' so that each formed block affords a compression abutment for each succeeding block compressed by the plunger. I prefer to provide inwardly projecting fingers, such as 27 at intervals about the cavity, at a point registering with the rear surface of the second block. When in the projected position as shown in Fig. 2, they serve to sustain part of the thrust pressure

(Testimony of William Howard Clapp)

of the piston, and they may be utilized to assist in maintaining separation of blocks x and x'."

Mr. L. S. Lyon: If your Honor please, I failed to hear—I don't know for sure what the witness designated as the cover, which he referred to in his testimony. I did not get that number.

Mr. Foster: Perhaps I can bring that out, Mr. Lyon.

Q. I note that reference is made, Professor Clapp, page 2, from line 40 to 48 to a valve-like plate, which remains in a closed position, cutting off escape of the snow, and serves as a top wall for the compression. That is the dotted line shown in Fig. 2. Will you describe to [1333] the court where that appears in the drawing?

A. Yes. The cover or slide is shown in Figure 23.

Q. Numeral 23 in Fig. 2?

A. Numeral 23 of Figure 2, and the dotted extension of that section cover represents his forward position, completely covering the opening.

Q. Do you find that alternative means are stated in the patent to be capable of use in actuating the plunger? I call your attention to page 2, lines 35 to 38.

A. Yes, commencing on line 35.

"is closed at the other end by head 22, reciprocated by a power cylinder, screw or other suitable motor means."

To summarize there is disclosed—first, I will say reference is made to an expansion nozzle, beginning at page 2, line 22:

"The expansion nozzle, as also the precooling super-compression and follow-up pressure on the supply of the liquid to the nozzle, breaking up of the snow deposited on the walls of the chamber, etc., may be set forth and claimed in said companion applications."

(Testimony of William Howard Clapp)

And for exit of gas, beginning line 11, page 2:

“for circulation of the waste carbon dioxide gas which has an outlet through screen 7 near the discharge end of the chamber.”

This description was concerned principally with the pressing means, and I think quite obviously refers to the [1334] preceding patent.

Shall I finish my summary?

Q. I think you barely commenced, Professor, and then interrupted it to point out the inlet and the outlet.

A. Yes. Well, to summarize, there is disclosed a snow-forming chamber, a cover or lid closing the chamber, means for opening, a supply inlet for carbon dioxide gas—it is liquid carbon dioxide, an outlet for carbon dioxide gas, a pressing plunger, and means for operating the plunger.

Q. Inasmuch as this Martin patent discloses a closing member for closing off the snow chamber 20 from the compressing chamber 21, in addition to the closure of the snow chamber effected by the piston itself, as in Fig. 2 of the patent in suit, would you say that the snowing operation could be performed continuously in this Martin apparatus while the pressing operation is performed intermittently?

A. Yes, sir.

Mr. Foster: Did the court have any question on this patent?

The Court: Read that last question again, please.

(Question read.) A. Yes, sir. [1335]

Q. By the Court: Well, you mean by that, that the snowing operation could be carried on independently of the compressing operation?

A. Yes, sir. I base that—

(Testimony of William Howard Clapp)

Q. How do you take the snow out; just take it out from below without pressing?

A. Yes; with the closure lid 23 closed, during which time we could be snowing, snow may be pressed forward and ejected, that is, it does not show the plunger 22 and the cover 23 is operating together. They have not traveled through the same distance, at least, as the piston advances.

Q. What other purpose is the cover for?

A. To close off the chamber, the patent states, and to make a top wall for the pressing chamber during the pressing operation.

Q. By Mr. Foster: Would you direct your attention next, Professor Clapp, to the Voightlander patent No. 1,726,373, which is tab No. 22 of Defendants' Exhibit EE, and point out what is there disclosed?

A. This is a device for pressing water out of laundered articles without too much injury to the fabric; and it consists of a cylinder 1, having a bottom 3 described as welded to the cylinder, a quick removable cover plate 5—no; 7, having the interrupted threads or breech-gun type of mechanism, as illustrated in Figs. 5 and 6. There is another platen, we might call it an additional closure head, 18, operated by [1336] a piston in cylinder 15 located above the pressing cylinder by means of which the cover plate may be raised when it is given a slight turn so as to free it from the interlocking threads, and in the raised position material may be charged into the container. There is a bottom plunger 41. Both this plunger 41 and the platen 18 are shown with perforations or holes through which, the lower one for water to drain through and to be carried out at the bottom by a drain pipe 42



(Testimony of William Howard Clapp)

controlled by a valve 43. After the water has been pressed from the article, compressed air is admitted through valve 47, pipe 46, to the entrance shown dotted above the platen 18 which was described as having perforations and this air passes down through the material and out through pipe 44 and 45 which is described as being connected to a vacuum line. I believe that describes the—

Q. Would you give us a brief summary now of the machine disclosed?

A. There is disclosed a pressing chamber, a closure lid or head, means for raising the closure lid, a supply or inlet for compressed air, an outlet for the same, also an outlet for water, a pressing plunger, and hydraulic means for moving both the plunger and the upper platen.

Q. Is my understanding correct, Professor Clapp—I am referring to Fig. 1 of this patent, where the entire device is shown—is my understanding correct that when the operation of the device is completed, the patent instructs that this [1337] quickly removable head 7 shall be removed and the closure head 18 elevated out of the chamber and the compressed material in the chamber moved upwardly through the open end of the chamber while supported in the chamber 41, is that correct?

A. That is right.

Q. And it is clearly taught by the patent, is it, that the closure head 18 may be moved upwardly in the chamber above this inlet 46; is that true? Do you see where the inlet 46 comes into the chamber as shown by dotted line?

A. The pipe inlet 46?

Q. I beg your pardon? A. The pipe inlet 46?

Q. Yes. A. Yes. Yes; that is true.

(Testimony of William Howard Clapp)

Q. And that closure head 18, according to the teaching of the patent, may be moved into the chamber above that gas inlet, is that correct? A: Yes; that is right.

Q. If that plunger head 18 of this Voightlander patent is moved in the chamber above that fluid inlet 46 and liquid carbon dioxide is supplied to the chamber through that fluid inlet 46 would this device be adapted for the solidification of carbon dioxide by expansion and the compression of the solid carbon dioxide into blocks in the same apparatus?

A. By closing off the drain pipe—I don't know as it [1338] is necessary to even do that. There is no reason why you should not have two outlets for gas and one outlet for liquid carbon dioxide.

Q. What is your answer, then?

A. My answer is certainly.

Q. And in that operation if the valve 43 in the line 42 is open and the valve 45 in the line 44 is open, the gas could escape through both of the lines? A. Yes, sir.

Q. And is that what you meant in your last answer?

A. Yes, sir.

Q. And this plunger 41 is constructed so that the carbon dioxide gas can pass around it to those gas outlets, is that correct? A. That is true; yes, sir.

The Court: Would you read that last question?

(Question read by the reporter.)

Q. By the Court: In other words, it doesn't make contact with the shell?

A. Yes, sir. It is shown as not making contact.

The Court: I beg pardon?

A. It is shown as not making contact.

The Court: Yes; it is so shown.

(Testimony of William Howard Clapp)

Q. By Mr. Foster: In addition, that pressing plunger 41 has a —pressing plunger 37. The number does not appear on that figure. But at any rate, the pressing plunger on the [1339] bottom of the chamber has a perforated disc 41 on it, in accordance with the teaching of this patent, doesn't it, Professor? A. That is right.

Q. And those perforations connect with troughs in the piston to permit the free passage of fluid past the piston?

A. Yes, sir.

Mr. Foster: That is described, your Honor, on page 2, about lines 16 to 26.

Q. And in the operation of that apparatus in the manner you have described, admitting liquid carbon dioxide through the fluid inlet described in the apparatus and withdrawing the carbon dioxide gas through the fluid outlets that are described in the patent, we would be able at the completion of the compressing operation to eject the block of compressed carbon dioxide upwardly through the open end of the solidifying and compressing chamber. Is that correct? A. Yes, sir.

Q. In doing those operations that would operate both the pressing plunger and the closing head by hydraulic means, is that correct? A. Yes, sir. Yes.

Q. Now, will you direct your attention to the British patent No. 263,992, issued to Haynes, and tell the court what is there presented?

Your Honor, that is not in your book, I fear. It is in [1340] evidence as Defendants' Exhibit M, and I have an extra copy of it here which you may desire to insert. Your Honor will recall, I think, the circumstances under which this was admitted. It was referred to by Mr.

(Testimony of William Howard Clapp)

Martin, and particularly the diagrammatic sketches, as being given to him.

Mr. L. S. Lyon: May I see this exhibit?

Mr. Foster: Do you have a copy, Mr. Lyon? I shall lend you a copy if you haven't.

A. This patent is concerned with a method of producing relatively pure carbon dioxide, making use of pure oxygen or gas with high oxygen content, using carbonaceous fuel and a carbonate of some sort.

The whole diagrammatic representation makes use, elaborate use, of counterflow of the heat both in the warming up of the product as it passes down through the rotary member No. 6 to the discharge of 5 and the warming up of the gases or the extraction from the product of heat by the gases cooling as it passes. And we are concerned, I think, only with the snow chamber which is shown at the bottom of the right-hand part of the diagram, and all that reference of which is contained in a short paragraph which I will quote:

"From heat exchanger"—

Q. Now you are reading from page 6, line 80, is that correct?

A. Page 6, line 80: "From heat exchanger coil 35a the cooled liquid passes to valve 36 and is expanded in a suitable [1341] snow tower 37: and a substantial portion or approximately 50% is converted into solid carbon dioxide, which may be allowed to fall into a suitable press 38 and is compressed into blocks or ejected, or both. The unsolidified portion of the liquid passing through valve 36 changes to a gas and passes through the porous walls 39 of vessel 37 to pipe 40 and heat exchanging coil 41. Here the cool gasses are reciprocally warmed at heat exchang-

(Testimony of William Howard Clapp)

ing relation with coil 35a, previously described, and passes into pipe 42 at substantially atmospheric pressure."

There is described there a snow chamber, an inlet for liquid carbon dioxide gas—for liquid carbon dioxide, an outlet for carbon dioxide gas, a pressing plunger, and in the diagram, mechanical means for operating the plunger.

Q. Would you for the purpose of one question turn your attention back to patent 1,104,920, which is the Osborne patent and which is tab No. 11 of Defendants' Exhibit EE? Do you have that patent before you? I want you to direct your attention to the drawing.

A. Osborne?

Q. Yes. Professor Clapp, if openings 13 in the apparatus of this patent were closed and liquid carbon dioxide were introduced through the pipe 15 at the upper end of the device, would this apparatus be adapted for the solidification of carbon dioxide by expansion and the compression of the solid carbon dioxide into blocks in the same apparatus? [1342]

A. It would.

Q. Now, will you direct your attention to the drawing in the Stastney patent, 1,288,255, which is tab 12 of Defendants' Exhibit EE? Do you have that drawing before you?

A. Stastney?

Q. Is the apparatus illustrated and described in this patent adapted for the solidification of carbon dioxide by expansion and compression of solid carbon dioxide into blocks in the same apparatus?

A. You are referring to the Stastney?

Q. Yes. A. We showed that it was.



(Testimony of William Howard Clapp)

Mr. Foster: The model which was demonstrated this morning, and which I will ask be marked as Defendants' Exhibit—II, Mr. Clerk?

The Clerk: II.

Mr. Foster: We have had photographs made of that model. A set has been delivered to plaintiffs' counsel. I would like the clerk to mark that for identification as Defendants' Exhibit JJ-1, 2 and 3, No. 1 being the view which shows the disassembled apparatus with the top plate, No. JJ-2 being the photograph showing the cylinders open and the piston balanced on the top of the cylinders, and JJ-3 being the photograph of the assembled device, and JJ-4 being a bottom view of the device.

Q. Directing your attention to the photographs, [1343] Defendants' Exhibit JJ for identification 1 to 4, were these photographs made under your direction, Professor Clapp? A. They were.

Q. And have you compared the photographs with the model, Defendants' Exhibit II, which was demonstrated in court here this morning? A. I have.

Q. Are they photographs, actual photographs correctly portraying that model? A. They are.

Q. Will you point out to the court the dissimilarities and differences as regards the model illustrated by Defendants' Exhibits JJ-1 to 4 and the device illustrated and described in the Stastney patent?

A. I might say that Mr. Foster asked me to pick out one of these patents with the idea of demonstrating that on such a model of such a patent solid carbon dioxide blocks might be produced. I chose the Stastney patent because I could make it out of pieces of old pipe. I made

(Testimony of William Howard Clapp)

a sketch and took it to a manufacturer in Pasadena, out on East Colorado Street, and he built the device.

Looking at Exhibit JJ-2, there is shown an inner cylinder—

Mr. L. S. Lyon: If your Honor please, in connection with the last testimony of the witness, may we have the sketch that the witness made to have this device made from?

Q. By Mr. Foster: Was it a finished sketch or drawing, [1344] Professor Clapp?

A. Well, just a rough sketch. In part I told him what I wanted.

Q. And that the device was to be made, as I understand it, out of pieces of pipe, is that correct?

A. That is right.

Mr. L. S. Lyon: Do I understand the witness can't produce the sketch? He has testified as to a sketch. If he can produce it—

Q. By the Court: Did you destroy the sketch or do you still have it? A. No, sir; I still have it.

Q. Will you bring it in sometime? A. Yes.

Q. By Mr. Foster: You do not have it with you, do you, Professor Clapp? A. No; I do not.

Q. Will you continue with your answer?

The Court: Start over again, so I do not get mixed up.

A. There is shown in the photograph marked for identification JJ-2 an inner cylinder 6.

Q. By Mr. Foster: Is that shown in the Stastney patent?

A. It is. Concentric with that an outer cylinder marked 7 in the patent and on the photograph.

(Testimony of William Howard Clapp)

Q. May I hand you a copy of the drawing of the Stastney which does not have the claims pasted on it the way it has in [1345] your copy?

A. Yes. A base plate marked 13 on both to which the inner cylinder is attached. That is a cover for the bottom of the cylinder. And the outer cylinder is shown as a part of the base plate frame member 9.

As a matter of cheapness of construction, we have extended 13, welded both inner and outer cylinders to it. There is shown in the patent an inlet for compressed air to raise the plunger 14 and an outlet for the same to lower the plunger. These openings are shown in the bottom view, the inlet 16 being the one that was used and 17 being closed with a plug because it is just as easy to let the air out of the same hole.

The Court: The reference is to JJ-4.

Mr. Foster: Thank you, your Honor.

Q. By the Court: You use that 16 for two purposes, then?

A. Yes, sir. There is shown a pressing piston marked 14 on JJ-2 and JJ-1 resting on the top of the cylinder and the cover of which has been removed. There is also shown in JJ-1 the cover 18, an outlet valve 20, which has been placed to one side, and a cross inserted there so that we might use a safety valve on one member and a gauge on the other opening. There is shown a gasket and this cover has been made to close both the inner and outer cylinders, because the patent shows the jacket space as being integral with inner and outer cylinders, and this is a cheap construction and we wanted to [1346] show that the pipes entered these cylinders as disclosed in the patent.

(Testimony of William Howard Clapp)

Q. By Mr. Foster: In both the model and in the device of the patent, both the inner and outer cylinders 6 and 7 are closed at their upper ends when the device is in operation, is that correct?

A. The outside jacket only extends to the upper plate and to the lower plate.

Q. Yes.

A. The cover 18 with its gasket covers and seals the tops of both cylinders.

Q. Yes.

A. And there is shown in Figure JJ-3 nuts 19 corresponding to the closure means shown in the patent.

Q. I notice that upon each of these exhibits JJ-1 to 4 there have been added numerals and lead lines in any view indicated. Do those numbers correspond to the numbers of the corresponding parts in the Stastney patent 1,288,255?

A. They do.

Q. And do the parts indicated by the same numbers in the Exhibits JJ-1 to 4 and in the Stastney patent correspond, in your opinion?

A. They do.

Mr. Foster: The photographs marked for identification as Defendants' Exhibits JJ-1 to 4 are offered into evidence as Defendants' Exhibits of the same letters. [1347]

The Court: They may be received.

[Note: Defendants' Exhibit JJ will be found in the Book of Exhibits at page 1565.]

The Witness: I believe I did not describe—

Mr. Foster: Pardon me?

The Witness: —inlet pipes 11 and 12 which lead through to the jacket space and which are marked correspondingly on the patent.

(Testimony of William Howard Clapp)

The Court: Let me see those, please.

Q. That overflow valve 20 was the one that extended out, and you had attached a pressure gauge to that, is that right?

A. That was the one through which we exhausted.

Q. Where was your pressure gauge?

A. The pressure gauge was on a small pipe extending from the top of the cross.

Q. Oh, yes.

A. And the little member at the right closing the cross is a safety valve.

Mr. Foster: This I understand to be the safety valve, your Honor, that will rupture at predetermined maximum pressure, and this was the cock or valve through which the discharge was made (indicating on Defendants' Exhibit II).

Mr. L. S. Lyon: Has the witness concluded his statement as to all the differences between this device and the patent?

Q. By Mr. Foster: Are those all of the substantial differences between the device of the Stastney patent and the model?

Mr. L. S. Lyon: The question before was not limited to [1348] "substantial". I think the court would want to know what the differences are and the court can decide whether they are substantial or not.

A. They are all the differences. We use a different frame or foundation for the support.

Q. By Mr. Foster: I understand from Fig. 2 of the Stastney patent that the inner and outer chambers may be made rectangular in cross-section. Have you a reason



(Testimony of William Howard Clapp)

for having the chambers of the model, Defendants' Exhibit II, made circular in cross-section, Professor Clapp?

A. Yes; so I could have it made cheaply out of some old pipe.

Q. And I notice that in the model you have the top plate 18 connected removably to the apparatus by four bolts and nuts, whereas the patent, the Stastney patent, shows that there are just bolt means projecting from the upper end that are secured by nuts. What was the reason for that difference?

A. Two which I give, cheapness of construction and to afford an opportunity to see the space in the jacket.

Mr. L. S. Lyon: May I ask which the witness means is the cheapest to construct, to put four wing nuts on top of the plate or to use those bolts?

Mr. Foster: I have no objection to asking that for you, Mr. Lyon.

Q. Having available pipe of the two sizes required for [1349] the model, which was the cheaper way, in your opinion, to connect the closure head to the chamber, Professor Clapp, by using four bolts and the four nuts that you have employed in the model, or by copying exactly in detail the fastening means that are illustrated in the Stastney patent?

A. The second method would be much more expensive.

Q. I understand that in the Stastney patent, 1,288,255, the pipes 11 and 12 are described as being employed at some stage of the process for circulating and cooling gas between the inner and outer chambers, for the purpose of cooling the contents of the inner chamber, is that correct?

A. That is right.

(Testimony of William Howard Clapp)

Q. In the demonstration of the model which was made in the courtroom this morning no cooling gas was circulated between those two chambers, was there?

A. No; there was not. It would be entirely possible to do so for that arrangement if we wished.

Q. Do you mean by that, that we could connect the outlet pipe 20 at the upper end of the device of the Stastney patent and the model to the inlet pipe 11 shown near the bottom and thus circulate the cold carbon dioxide evolved from the inner chamber in the jacket between the chambers; is that what you contemplate? [1350]

A. Yes. All that would be necessary would be to make a connection between that valve shown in the outlet marked 20 in the patent and bring it down and connect it with one of those pipes as an inlet to the jacket.

Q. By one of those pipes you mean 11 or 12?

A. 11 or 12.

Mr. Foster: I did not understand whether my offer was accepted, your Honor.

The Court: It will be received for the purpose of illustrating the testimony of the witness.

Q. By the Court: The only object of these pipes 11 and 12, was to inject steam to raise the temperature to about the temperature of the soap, and then cool it off later?

A. That is true.

Mr. Foster: That is also described as a cooling apparatus.

The Court: Yes; first heating, and then later cooling. That does not infer you would not have used it at all, if you wanted to take plenty of time?

A. No.

Mr. Foster: The point of my last question with regard to circulation of carbon dioxide was that some of

(Testimony of William Howard Clapp)

the prior patents had disclosed the use of the evolved gas, for heating purposes.

Q. Professor Clapp, as I pointed out, I have a question [1351] about the Cartier patent, 338,034, which is the first patent in that book. Do you have a drawing of that before you? If the device of this patent were provided with a liquid inlet, would it be adapted for the solidification of carbon dioxide, by the expansion and solidification of solid carbon dioxide in one apparatus?

A. It would.

Q. Take the Sailor patent, 467,783.

A. It could be so made, yes.

Q. And the Holden patent, 530,526? You have that before you? A. 530,526?

Q. Yes; if the liquid inlet and the gas outlet were provided at this chamber D of this patent, and the valve which is already shown in line E were closed, will this apparatus be adapted for the solidification of carbon dioxide by expansion and compression of the solid carbon dioxide into blocks?

A. That would mean a chamber D, with a surrounding wall or jacket space, which now contains water?

Q. Yes.

A. An inlet through the valve or pipe marked E?

Q. No, I say if the chamber D were supplied with a liquid inlet and a gas outlet, and this valve already shown in line E were closed, will this apparatus be adapted for solidification of carbon dioxide by expansion and [1352] contraction of solid carbon dioxide into blocks?

A. It would.

Q. You have made reference from time to time, during your direct examination, to the chart marked De-

(Testimony of William Howard Clapp)

Defendants' Exhibit FF for identification. In your opinion, do the references to the page numbers of the various patents which appear thereon indicate the presence of the elements corresponding to the column set forth on the chart? A. What is that?

Q. I say, do the numbers, the line numbers opposite each of the patents on this chart, indicate to the best of your knowledge the presence of the elements set forth in the headings of the chart? A. They do.

Mr. Foster: The chart marked Defendants' Exhibit FF I offer in evidence as Defendants' Exhibit FF.

The Court: It may be received for the purpose of illustrating the testimony of this witness.

Q. By Mr. Foster: Professor Clapp, I have asked you to apply one of the apparatus claims in issue to some prior art patent which you have thus far discussed. Have you done so? A. I have. [1353]

\* \* \* \* \*

Mr. Foster: That completes my examination. Mr. Miketta has a few questions to ask on the direct examination.

(Short recess.)

#### Further Direct Examination

Q. By Mr. Miketta: Professor Clapp, you have testified regarding the patent in suit, and have read it, have you not? A. I have.

Q. As I understand your testimony, a man reading the patent in suit, and desiring to construct a machine of the patent, a machine which would form solidified carbon dioxide and also compress it into a block, would have to

(Testimony of William Howard Clapp)

determine for himself, and without instructions from the patent in suit, as to what maximum pressure he should maintain within the snow chamber, is that correct?

A. He would have to know what pressures were used [1359] to produce his product of carbon dioxide snow, yes.

Q. There is no statement in the patent telling him what maximum pressure to employ in that snow chamber? A. No.

Q. And such a man, skilled in this art, desiring to make a machine of the patent in suit, would have to determine of his own knowledge, without instruction from the patent in suit, as to how thick the walls of the chamber should be; is that correct? A. It is.

Q. And it would be necessary for a man skilled in this art, without the assistance of the teachings or an express teaching or instruction of the patent in suit, to determine for himself the size of that snow chamber; is that correct? A. The relative size of it.

Q. And it would be necessary for a man skilled in this art, without the assistance of the patent in suit, to determine what type of nozzle he should use in such a chamber; is that correct? A. It is.

Q. And it would also be necessary for the man skilled in this art, without instruction from the patent in suit, to figure out for himself the rate at which the liquid carbon dioxide is introduced into the chamber? A. Yes.  
[1360]

Q. That is not taught in the patent? A. No.

Q. It would also be necessary for a man skilled in this art, and without the teaching or instruction of the patent in suit, to determine for himself, from some other



(Testimony of William Howard Clapp)

available data, what volume of gas would be generated when he did introduce liquid carbon dioxide into the chamber? A. Yes, approximately.

Q. And it would also be necessary for the man skilled in this art, and without the teaching and instruction from the patent, to determine the relative sizes of the inlets and outlets from such chamber; is that correct?

A. Yes.

Q. There is nothing in the patent giving him the relative sizes of the inlets and outlets, is there?

A. No.

Q. Is there anything in the patent to inform the man skilled in the art as to what pressure he should exert in the chamber before he starts pressing? A. No.

Q. So that is another point he would have to determine for himself, and without instructions from the patent? A. Yes.

Q. Is there anything stated in the patent as to pressure at which the snow is to be compressed in making the block? [1361] A. No.

Q. So that this man skilled in the art would have to determine that for himself; is that correct?

A. He would.

Q. Is there any statement in the patent as to what specific density the snow is to be compressed?

A. I found none.

Q. So that the man skilled in the art, without instruction from the patent, would have to make that determination; is that correct? A. Yes.

Q. Is there any statement in the patent teaching this man skilled in the art to operate under conditions which we have called here triple point conditions? A. No.

(Testimony of William Howard Clapp)

Q. Therefore, he would have to determine for himself whether he is to make snow of triple point snow; is that correct? A. Yes.

Q. He would have to know enough not to leave the closure 70 open when he is introducing liquid carbon dioxide into the snow chamber, as shown in Figure 1?

A. Yes.

Q. And he would have to figure out for himself, and without instruction from the patent, as to the use of the rams and pressure to be employed in holding that closure [1362] 70 against internal pressure within the chamber 60; is that correct? A. Yes, sir.

Q. And he would also have to know, this man skilled in this art, that in order to obtain a stable block, he would have to relieve the pressure within the pressing chamber, to zero gauge, or substantially atmospheric pressure before pressing; is that correct? A. Yes.

Q. And, therefore, he would have to modify, and actually proceed contrary to the teachings of the patent, in relieving the pressure in that chamber before initiating his pressing operation? A. That is so.

Q. Is that correct? A. Yes. [1363]

\* \* \* \* \*

The Court: Before I hear from Mr. Lyon, let me see if I understand that we are all talking about the same thing. I am going to put this in words that I can understand. If you don't understand it, just say so. Your question, with its preamble, is in the nature of a hypothetical question. [1366] You have heretofore testified as to the teachings of certain patents; you have also testified as to the patent in suit; that a man ordinarily skilled in the art could not build and operate a machine to make

(Testimony of William Howard Clapp)

solidified carbon dioxide for commercial use, either triple point or other, without having recourse to mechanical skill to supplement the disclosures in the patent in suit. Now, the question is, could that same man, who had sufficient skill to draw upon his mechanical resourcefulness to supplement the disclosures and the teachings of the patent in suit, make a machine and produce solidified carbon dioxide for commercial purposes by following the disclosures in the other patents to which you have testified, and applying that same mechanical knowledge and resourcefulness that he is theoretically intending to apply to the patent in suit?

Mr. Foster: That's right. [1367]

\* \* \* \* \*

The Court: Let me ask you this question: If an ordinary skilled mechanic could not take the disclosures of a patent, apparatus, and method, and build and operate a machine to accomplish the purpose for which the apparatus was invented, what good is the patent? [1369]

Mr. Morris: May I say this,—whether it helps or confuses—

The Court: First, can you answer that question for me, Mr. Morris: What good is the patent if a man can't do that?

Mr. Morris: May I have the question?

The Court: If a man skilled in the art, an ordinary skilled mechanic, as of the time of the patent, can't take the disclosures of that patent, both as to apparatus and methods, and build and operate a machine to accomplish the purpose for which the patent is intended, is the patent any good?

(Testimony of William Howard Clapp).

Mr. Morris: The disclosure is inadequate under R. S. 4888.

The Court: Do any of you disagree with that?

Mr. Foster: No, sir.

Mr. Morris: I am again a little confused by the question—not your Honor's, but by counsel's. Counsel is attempting to show two things here: He is attempting to show that with the disclosure of the patent in suit a man skilled in the art could not supply the necessary know-how to operate the machine. Simultaneously—

The Court: No, I don't think that is an answer. You have missed something. I think he did just exactly opposite to that. I think it has been shown by this witness that a man who is sufficiently skilled could take the disclosures of the patent in suit, and applying his resourcefulness and his mechanical ability, he could build and operate a machine, [1370] is that correct?

A. Knowing the things of which I answered Mr. Miketta's questions, yes.

The Court: Knowing the things which you answered seriatim? A. Yes. [1371]

\* \* \* \* \*

The Court: Wouldn't it be the tendency of the learned man to not realize the difference between a man with an ordinary training and a man with more than an ordinary training?

(Testimony of William Howard Clapp)

The Witness: We have many mechanics over at Tech—and we had 15 years or so ago—to whom I could give a certain machine and tell them to look up the information, and I feel that those men—who were not engineers—would in many cases be able to work out a design that would act effectively. But this legal fiction of what an ordinary mechanic is, I don't know. [1378]

\* \* \* \* \*

The Court: \* \* \*

I believe a similar question—an open-minded question of that kind—would be improper so far as the other patents discussed by this witness and the disclosures in the prior art are concerned. But that is not the question that the defendants are asking. They are asking this hypothetical question as a follow-up to the series of questions: Professor, given a man who had mechanical ability and resourcefulness sufficient to supply the deficiencies in the patent in suit and still make an operative device, could that same man take the revelations in these other patents which you have indicated and do the same thing?

I am inclined to think that the question is proper from the standpoint of evidence, because they do give us a measuring stick. In all personal injury cases, or in cases in- [1382] volving expert testimony from an accountant—I have had much experience in that particular field—that would be a proper question, because the measuring stick is placed alongside the question. [1383]

\* \* \* \* \*



Los Angeles, California, Wednesday, May 24, 1944;  
10:00 a. m.

(Parties present as last noted.)

Mr. Foster: I neglected to offer into evidence yesterday, and I do so now, as Defendants' Exhibit KK the requests for admissions which was the subject of the stipulation yesterday.

The Court: It may be received and so marked.

[Note: Defendants' Exhibit KK will be found in the Book of Exhibits at page 1569.]

WILLIAM HOWARD CLAPP,  
recalled.

Direct Examination  
resumed.

The Court: You may proceed.

Q. By Mr. Miketta: Professor Clapp, just before we adjourned yesterday you were testifying regarding the various things that a person would have to determine for himself in order to construct and operate a machine for the solidification of carbon dioxide and pressing of such solidified carbon dioxide in the same chamber. I think the question was rephrased several times and finally took this form: Can a man who had mechanical ability and resourcefulness sufficient to supply the deficiencies in the patent in suit and still make and operate a device—could that same man take the revelations in these various other prior patents concerning which you had testified and do the same thing? A. Yes.

Mr. L. S. Lyon: Wait just a minute, please. I move to strike the answer. [1388]

The Court: It may be stricken.

(Testimony of William Howard Clapp)

Mr. L. S. Lyon: I think "the same thing" is entirely too indefinite. Is that intended to mean that he would and could build the patented device, Fig. 5 of the patent, or is it intended to mean that he could make some dry ice with some unknown combination of these prior references? And also, I object in the question to the use of the term "deficiencies". The witness has not testified that these are deficiencies in the patent. He has merely testified that certain details of pressures and size and things of that kind are not specified in the patent. I do not regard them as deficiencies.

The Court: You are putting a technical meaning on the word "deficiency." He has testified as to certain things that are not disclosed expressly in the patent. Those are the matters referred to as "deficiencies", not that they are deficiencies necessarily to the extent to make the patent invalid, but they are deficiencies in that they are not expressed in the patent. You may answer the question.

A. Yes.

Q. By Mr. Miketta: In order for a man to build a machine to solidify and compress carbon dioxide in the one apparatus from the disclosure of the patent in suit he must have some knowledge to supplement the disclosures of the patent, is that correct? A. Yes. [1389]

\* \* \* \* \*

Q. What knowledge in addition to that required by such a man to supplement the disclosures of the patent in suit would be required by that man in 1925, having before him the prior patents concerning which you have testified and knowing nothing of the patent in suit, in order for that man to build and successfully operate a machine to solidify and compress [1390] carbon dioxide in a single apparatus?

(Testimony of William Howard Clapp)

Mr. L. S. Lyon: If your Honor please, I object to the question as indefinite and confusing and also as meaningless. For instance, if I understand it, the prior art includes, for example, the snow tank, and the evidence is they did operate the snow tank. Is this witness testifying to what would be necessary to know in order to operate the snow tank, or what is he talking about?

The Court: I do not think the question is sufficiently explicit, and I think the objection is sound. Now, let me ask counsel if this is what he wants Professor Clapp to answer? I am again going to phrase it in my own phraseology and it may not be at all what you want to ask him; if so, just express yourself.

Professor Clapp, you have testified to certain disclosures in the patent in suit. You have testified to what we have described as deficiencies in the patent in suit, the meaning of "deficiencies" being that there is no express language in the patent to indicate those particular matters which you have testified to yesterday afternoon. Now, you have also testified as to certain patents in the prior art, certain ones in this book numbered, I think, from about 1 to 32. Would the same man whom you have testified about in connection with the patent in suit have to supply additional information in order to build the machine which has been described, than those elements which you have testified [1391] about in connection with the patent in suit?

Is that what your point is?

Mr. Miketta: That is substantially the question, your Honor. I adopt that.

The Court: Have I made it clear to you?

Mr. Miketta: Would it help you to have the question read back?

(Testimony of William Howard Clapp)

The Court: Let us see if you understand it. Maybe you can express it much better.

A. Given a man who had the knowledge necessary to construct a machine of the patent in suit, would the disclosures given in the patent in suit, and supplied the deficiencies, and supposing that this man had before him all of the information given in these prior patents—

The Court: About which you have testified.

A. About which I have testified, would such a man be able to construct a machine capable of making carbon dioxide blocks?

The Court: In one unit. A. In one unit?

The Court: And without any knowledge, or having seen or heard of the patent in suit for that particular machine.

A. Yes, and without having heard of the patent in suit.

Mr. L. S. Lyon: I object to that, your Honor, as incompetent, and not a proper method of proof; it is pure speculation. No foundation has been laid for the witness.  
[1392]

The Court: Objection overruled. You may answer.

A. He would.

Q. By Mr. Miketta: Would he require any additional knowledge to that which he required in one of your previous answers to build a machine of the patent in suit?

Mr. L. S. Lyon: Same objection.

The Court: Same ruling.

Q. By Mr. Miketta: And which was not supplied by the prior art? A. No.

Q. What is your answer?

A. No, he would not require additional knowledge.

Mr. Miketta: I think that will be all, your Honor.

(Testimony of William Howard Clapp)

The Court: I might explain the basis of my ruling. I feel that the objections made would go rather to the weight to be given the testimony than to its admissibility. I think that with the limitations and the discussion which we have had, the questions are understandable, and that the witness understood them, and that they are clearly admissible from the mouth of an expert. Any further questions on direct, Mr. Foster?

Mr. Foster: No more questions.

The Court: You may cross examine. [1393]

#### Cross-Examination

Q. By Mr. L. S. Lyon: Prior to May 22, 1928, Professor, had you ever been engaged in the manufacture of dry ice for sale? A. No.

Q. Had you ever seen dry ice manufactured for sale? A. I could not be certain.

Mr. Foster: I object to that as indefinite, unless the question means prior to some date.

Mr. L. S. Lyon: The date is specified; prior to May 22, 1928.

The Court: That is rather indefinite—manufactured for sale. He might have seen it manufactured. It is a compound question.

Mr. L. S. Lyon: If the witness can't answer the question, I don't want to confuse him at all, but when I ask a man if he has ever known of seeing something made for sale, I think that is a definite question.

Mr. Foster: I object upon the ground that it is indefinite, compound, and calls for a conclusion.

Mr. L. S. Lyon: I will reframe the question:



(Testimony of William Howard Clapp)

Q. Prior to that date had you ever seen dry ice manufactured in commercial quantity, or on a commercial scale? A. I would not be certain.

Q. Prior to this date had you ever seen a machine in which dry ice could be manufactured on a commercial scale? [1394]

Mr. Miketta: That is objected to, your Honor, upon the ground that it is indefinite in the use of the word "commercial".

Mr. L. S. Lyon: I am trying to avoid the use of the word "sale". I think people know what we mean when we say on a commercial scale, as distinguished from a laboratory experiment.

The Court: I think this witness understands what he means. He means commercial as distinguished from a laboratory experiment. Read that question.

(Question read by the reporter.)

The Court: You mean the actual apparatus; not the drawing?

Mr. L. S. Lyon: I mean the actual apparatus, yes.  
A. No.

Q. Prior to May 22, 1928 did you give any courses, including anything about what apparatus might be employed for the manufacture of dry ice on a commercial scale, or what method might be used for that purpose?

A. I may have done so. My work was along the line of machine design, in which we brought in as illustrative material a great variety of machines of all sorts; but I could not say positively that I had.

Q. Have you ever given any such course?

A. In the manufacture of carbon dioxide snow or ice?

Q. And the design of the apparatus to be employed therein. [1395]

(Testimony of William Howard Clapp)

A. No, not as a course. I have given courses of design and construction of pressure vessels to stand various pressures.

Q. You have stated there is no statement in the patent in suit as to what pressure is to be employed in the operation of the press shown in Fig. 5. Do you know, as of May 22, 1928, what knowledge was had by the practical workers in the dry ice field as to what pressure should be employed in the solidification of liquid CO<sup>2</sup>?

Mr. Miketta: I object to that as indefinite; as to pressure at what particular stage of the operation reference is being made. It is calling for a conclusion.

The Court: Read the question, please.

(Question read by the reporter.)

A. I think I do.

Mr. Foster: May we have a ruling on the objection?

The Court: Overruled. The question is if he knows.

Q. By Mr. L. S. Lyon: Did you have that knowledge as of that date, May 22, 1928, or is it based on something you have read or heard since?

A. No, I was acquainted with the relationships of pressure and temperature and volume of carbon dioxide, and its liquids in solid and gaseous states; and I had an instructor under me, Mr. Ogier, who about that time, or a little before, went into the active manufacture of carbon dioxide on a commercial scale, and I had conversations with [1396] him with regard to the work; but I am not able to fix in my mind the exact time.

Q. You don't know whether that was before May 22, 1928, or after?

A. I am quite sure it was sometime before.

Q. How long before, as nearly as you can tell us?

The Court: 1929 was the financial debacle. That may help you.

(Testimony of William Howard Clapp)

Mr. L. S. Lyon: It did not mean so much the college professors, I hope, your Honor.

The Court: I don't know. I am afraid it did.

A. This young man graduated from the institute, or just failed to graduate, before the last war; then he came back with us as an instructor, and was an instructor. He finished his work, and came back as an instructor, and was there for maybe five or six years—I am not sure; then he went out into this dry ice field, so it is my belief that it was quite a long time before 1928.

Q. By Mr. L. S. Lyon: What pressures were employed by Mr. Ogier, as you learned of his work?

Mr. Miketta: I object to that as indefinite, and not identified as to the particular stage of the operation.

The Court: Objection sustained. The pressures about which he talked in the patent were the maximum pressures in the snow chamber. I think you should indicate particularly which pressure you refer to. [1397]

Mr. L. S. Lyon: I had better state it piece by piece.

Q. Can you answer the question with reference to the temperature during the feeding into the apparatus of the liquid CO<sup>2</sup>?

Mr. Foster: That is objected to—

Mr. L. S. Lyon: I mean the pressure instead of the temperature.

Mr. Foster: Objected to as immaterial, and calling for hearsay.

The Court: Overruled. He has a right to test his knowledge of the art.

A. Yes, we know that carbon dioxide—

Mr. L. S. Lyon: I am afraid you are not answering my question, Doctor.

(Testimony of William Howard Clapp)

The Court: No. Read that question for Professor Clapp, Mr. Reporter.

(Question read as follows: Can you answer the question with reference to the pressure during the feeding into the apparatus of the liquid CO<sup>2</sup>?)

Q. By Mr. L. S. Lyon: The question is, Professor, what was that pressure employed by Mr. Ogier, as you learned of his work?

A. Well, he introduced the material as a liquid, and allowed it to evaporate, and it was in a cool state and under pressure when he introduced it. Do you mean the pressures at which it was introduced into the chamber, or the [1398] pressure within the chamber?

Q. The pressure within the chamber during the time the CO<sup>2</sup> was going in.

A. I should say anywhere from atmospheric up to 60 to 70 pounds per square inch.

Q. Are you answering now as to your recollection of what Mr. Ogier actually employed, as you learned it at that time?

A. And my knowledge as I have talked with him of the relationships of pressure and temperature.

Q. What pressure did he actually employ at that stage of his operation, as you were informed then?

A. I couldn't say that definitely, of my recollection.

Q. Do you know whether or not, prior to May 22, 1928, you had any knowledge of the manufacture of dry ice at the triple point?

Mr. Miketta: That is objected to as immaterial, your Honor; it is not referred to in the patent.

The Court: Well, that is true, and yet he is testing the knowledge of this witness of the subject as of that

(Testimony of William Howard Clapp)

time, not for the purpose of proving or disproving a fact, but to show what his experience and knowledge was at that time; and, with that understanding, I think the question is proper. You may answer.

A. I knew what the triple point of carbon dioxide meant and I am pretty sure that I knew at that time the conditions [1399] of pressure, temperature, and volume under which the three phases of gas, liquid, and solid could co-exist.

Q. By Mr. L. S. Lyon: You knew that as a matter of scientific knowledge, I take it, at that time?

A. Yes.

Q. But did you know of the manufacture of triple point dry ice at that time?

Mr. Foster: Objected to unless it is meant for the same limited purpose as indicated by the court.

Mr. L. S. Lyon: That is all.

The Court: It is undoubtedly for the same limited purpose. You are speaking now either as laboratory experiments or commercially, either way?

Mr. L. S. Lyon: Either way at the moment.

A. Well, I think I should say that the word "triple point" as used in the art here is very much more loosely used than we use it in a scientific way.

The Court: You just explain how you used it in a scientific way.

A. There is a very broad, profound generalization of science known as the "Phase Rule" which gives the relations between the various phases—in this particular case, gas, liquid, and solid—the number of components in the system—in this case, one,  $\text{CO}_2$ —and what is called the degrees of freedom, and by that I mean the number of



(Testimony of William Howard Clapp)

variables—pressure, temperature, and volume, or what is the same thing, [1400] since we are referring to a definite weight of substance, say, a pound—the proportions of the constituents—of the phases, rather—and the Phase Rule states that the degrees of freedom, that is, the number of these variables, pressure, temperature, or volume, which may be independently varied without causing any of these phases to disappear, regardless of the number of components of the system, is expressed by the term “the degrees of freedom are equal to the number of components present, plus two, minus the number of phases.” At triple point we have one component,  $\text{CO}_2$ ; we have three phases, liquid, solid, and gas. The Phase Rule states that the degrees of freedom are these components, one, plus two, minus the number of phases, three; in other words, there are no degrees of freedom.

That means that we cannot independently alter the pressure or alter the volume or alter the temperature without causing one of those phases to disappear.

Now, that is the sense in which triple point is used scientifically. Here we may be expanding into a chamber in which the volume is changing continuously, pressure may be varied during that time. We say we make triple point ice. That would mean that, at some time during this operation, there should exist within that cylinder conditions under which solid, liquid, and gas will simultaneously co-exist.

Q. Professor, perhaps if I explain to you what I am interested in perhaps we can shorten this up, which I would [1401] like to do. I am not questioning your scientific knowledge at all. What I am interested in is what you knew about what the men working in  $\text{CO}_2$  art,

(Testimony of William Howard Clapp)

commercial art, knew prior to May 22, 1928. Am I to understand that you had a knowledge of what those men knew at that time, or, as a matter of fact, you did not know what they knew; you were not in contact with the industry where you would know; is that latter correct, or what is the fact?

A. I was in contact with the industry because I was very much interested in this young man and his work. We discussed it. My memory of the thing is not very sharp, but we knew that liquid carbon dioxide was expanded in a chamber and snow was made and snow was pressed.

Q. Was your knowledge confined, so far as what the commercial men knew or what their practices were at that time, to what you learned about Mr. Ogier's operation? Did you have any other contact with the commercial CO<sup>2</sup> art?

A. Not that I can recall.

Q. Did Mr. Ogier ever build an apparatus and operate it on a commercial scale? I mean by the latter, on a regular production scale as distinguished from a laboratory operation?

A. I don't know whether he built an apparatus or not. He was engaged in the commercial production of dry ice.

Q. Did you see his apparatus? A. No.

Q. And you can't remember now what pressures he operated [1402] at at the different stages of the operation, is that correct?

A. No; I don't know definitely the pressures at which he operated. I know they must have been within certain limits.

Q. You also specified that the patent in suit does not disclose the type of nozzle or shape used at the CO<sup>2</sup>

(Testimony of William Howard Clapp)

inlet. As of May 22, 1928 did you have any knowledge of what types of nozzles were employed in the dry ice industry for that purpose?

A. I don't know as I ever saw any nozzles. The principles employed are the same principles as are employed in hydraulics.

Mr. L. S. Lyon: I move to strike that out. I am not asking the witness what the principles are. I am asking him what he knew at that time.

The Court: Read the question.

Q. By Mr. L. S. Lyon: Did you actually at that time have any knowledge of what types of nozzles were being employed for that purpose in the dry ice industry?

A. I think I did.

Q. How did you get that knowledge?

A. By conversation with Mr. Ogier.

Q. What type of nozzle was he using?

A. I believe he was using a straight nozzle.

Q. Do you remember?

A. No; I would not be positive. [1403]

Q. And all you knew about it at that time was what you learned Mr. Ogier was using, is that right?

Mr. Foster: Objected to as indefinite, "all you knew about it".

Q. By Mr. L. S. Lyon: About the type of nozzle employed in the dry ice industry at that time for that purpose? A. I will not be sure.

Q. You have stated that the patent in suit does not disclose or specify the rate of liquid CO<sup>2</sup> feed into the apparatus. At that date, May 22, 1928, did you know what rates of feed were being employed in the dry ice industry?

(Testimony of William Howard Clapp)

A. Well, that is a very indefinite question. It says nothing of the size of the cylinder, which would make a great deal of difference; it says nothing of the pressures on the inlet side, all of which would control the rate of flow into the material.

Q. Well, taking those into consideration as part of the factors in determining the rate of feed, did you know what rates of feed were practiced in the industry at that date? Did you have any knowledge of it?

A. No. I don't think I gave it any thought.

Q. Your answers would be the same for each of these other factors that you say are not specified in the patent in suit, to-wit, that you had no more knowledge than you have indicated as to any of them as of May 22, 1928?

Mr. Foster: Objected to. [1404]

Q. By Mr. L. S. Lyon: Isn't that correct?

Mr. Foster: Objected to as vague, indefinite, and compound. The witness has testified to varying degrees of knowledge, and compound in not reciting all of these factors separately.

Mr. L. S. Lyon: I am trying to shorten this up.

The Court: I do not believe you can, though, under the circumstances. The objection is sustained. I think you might ask a general question which might cover it.

Q. As I understand it, Professor, your knowledge of the practical manufacture of solidified  $\text{CO}_2$  at that time was gleaned from your general scientific knowledge, what reading you came across, your contact with this assistant of yours who was engaged in the production?

A. That is right.

Q. You had no contact with others engaged in the industry to talk over their problems, or they did not give

(Testimony of William Howard Clapp)

you any particular information about the problems they were facing? A. Not that I can recall.

Q. By Mr. L. S. Lyon: Professor, will you turn to Fig. 1 of the patent in suit? Do you find on the line 80, opposite the heat exchanger 40, a valve which carries no number?

A. With an arrow pointing upward alongside the valve?

Q. Yes, sir. A. I do. [1405]

Q. In the operation of the apparatus shown in Fig. 1 during the boil-out period it would be possible, would it not, by a sufficient closure of that valve to maintain a pressure of, say, 75 pounds on the solidifying chamber?

Mr. Miketta: Objected to, your Honor, as assuming a fact not in evidence. The witness has not testified and the patent does not refer to a blow-out period.

The Court: Read that question, please.

(Question partially read by the reporter.)

Mr. L. S. Lyon: No. I had better rephrase the question because that would be objectionable. Just strike it out, please.

Q. In the operation of the apparatus shown in Fig. 1 could not the valve just mentioned be sufficiently closed so as to maintain a pressure of 75 pounds in the solidifying apparatus during a boil-out period?

Mr. Miketta: The same objection, your Honor. No reference made to boil-out period.

The Court: I do not remember any reference in the patent.

Mr. L. S. Lyon: Well, I don't think any is necessary, anything is necessary of that kind in the patent. I am basing my cross examination on pages 1206 and following



(Testimony of William Howard Clapp)

of the record, in which the witness, as I understood his testimony, attempted to say that certain things could not be done with this apparatus, and I want to show that they can be done with it. [1406]

The Court: 1206?

Mr. L. S. Lyon: 1206, beginning at the bottom of page 1205, the question. That is volume 11, your Honor, at the bottom of page 1205.

"Q.—There has been some testimony in this case with respect to operations in which carbon dioxide gas was fed back into the snow chamber 50 or a similar snow chamber when the liquid inlet was closed, to build up in there a pressure of the carbon dioxide gas of 40 pounds or 30 pounds or 50 pounds. In view of the disclosure of this patent, would it be possible with the apparatus in Fig. 1 to do so?"

And the witness elaborated on the fact that this gas holder No. 12 would only hold a pressure of about one pound, and said, therefore he could not see how you could have any higher pressure than that in the system.

The Court: Suppose you just eliminate the boil-out period and ask him at any time if it would accomplish the same purpose.

Mr. L. S. Lyon: That is satisfactory. Of course, unless you had some period in mind you could not get such a pressure.

The Court: Well, then, that is up to him. His statement was in general terms

Mr. L. S. Lyon: Do you want me to recast the question?

The Witness: Please.

(Testimony of William Howard Clapp)

Q. By Mr. L. S. Lyon: Could not a pressure of, say, 75 [1407] pounds be maintained in the solidifying chamber 50 by a suitable closure of the valves to which I have called your attention?

Mr. Miketta: Objected to, your Honor, on the—

Q. By Mr. L. S. Lyon: And by also operating similarly and closing down the unmarked valve between the line 80 and the heat exchanger?

Mr. Miketta: Objected to, your Honor, on the ground that it is indefinite in the use of the word "maintained".

The Court: Well, let us use the word "built-up" instead of "maintained" for this question. You may answer.

The Witness: The word what?

The Court: "Built-up", build up that pressure.

A. "Built-up." Yes; if the inlet pressure was sufficiently high. I found no disclosures in the patent that called attention to any such type of regulation.

Q. By Mr. L. S. Lyon: But the apparatus disclosed in Fig. 1 is capable of such regulation, is it not?

A. Yes, sir. [1408]

Q. You have referred to the exhaustor 81, and stated that a common type of that device would be what is known as a Roots blower.

A. Roots blower, R-o-o-t-s.

Q. That is a positive motor-driven paddle type blower, is it not?

A. Not paddle type. It consists of cycloidal-shaped elements, which roll on each other continually in contact, much as two elaborately-shaped gear teeth would roll on each other.

Q. They are positively motor-driven?

A. They are positively motor-driven.

(Testimony of William Howard Clapp)

Q. Those devices were, at the date, say, May 22, 1928, on sale and recommended for use up to 125 pounds,—at least tested up to 125 pounds pressure, were they not?

A. No, I don't think so. I have been acquainted with them for a long while; in fact, I learned of the Roots blower when I went to college. So far as I knew, in my experience, they have always been used for low pressure work. Marks Mechanical Engineers Handbook, last edition, says that they are most efficient around 4 to 5 pounds per square inch pressure, and they are sometimes used up to 10 or 12 pounds pressure.

Q. Have you any knowledge as to what pressure they are tested for, or rated for by the manufacturer, as of that date? [1409]

Mr. Miketta: That is objected to as indefinite.

The Court: You can answer yes or no.

A. I think I have. I have seen lots of catalogues. You are asking me to go way back in my memory,—of the Roots blower, and I never saw one that proposed using them as a high pressure device, for which we use compressors. They are not efficient in that way.

Q. I am asking you, Professor, if you know whether or not they are tested by their manufacturer at a pressure which would permit their being used up to 120 pounds or 125 pounds?

Mr. Foster: I object to that as immaterial.

A. No, I don't know of any such tests.

Q. By Mr. L. S. Lyon: The Roots blower has been more or less a standard article since long before 1928; is that correct? A. Yes.

Q. I show you a catalogue which reads on the title: Roots Connersville Rotary Positive Blowers. Can you

(Testimony of William Howard Clapp)

identify that catalogue as illustrating the well-known Roots blower?

Mr. Miketta: May we approach the stand? Can we hear the question again?

(Question read by the reporter.)

A. Yes, and there are also high pressure relief valves in the same catalogue. [1410]

Q. By Mr. L. S. Lyon: Of the type that would be employed at the point indicated by the legend "Diaphragm Valve" in Figure 1 of the patent in suit?

Mr. Miketta: I object to that as calling for the conclusion of the witness, and is an assumption that the catalogue pertains to and is of the date of prior to May, 1928.

The Court: Objection sustained.

Mr. L. S. Lyon: Your Honor, I think I am entitled to ask the witness what type of well-known apparatus is indicated to him as an engineer by the point on the diaphragm to which I have called attention. He was permitted on direct examination to refer to the adjacent point, and stated what type of apparatus is referred to.

The Court: I thought that your question was directed to the particular illustrations in the catalogue.

Mr. L. S. Lyon: No, I am just using that to illustrate what it would indicate.

The Court: You asked him as a general application of these valves pictured in that catalogue, are they of the same general type that would have been used at that time for the purpose indicated, at the point of the diaphragm valve in the drawing? You may answer.

Mr. L. S. Lyon: That is the intent of my question.

(Testimony of William Howard Clapp)

Mr. Miketta: Then there is no foundation laid, because this catalogue is not of that earlier date to which counsel referred, 1928. [1411]

The Court: It does not make any difference. He is simply using that as a convenience to find out the opinion of the witness, if they used that type of valve.

Mr. L. S. Lyon: I think you haven't listened to the question. I think he was interested in the catalogue.

Q. You mentioned the pressure relief valves that are shown in this catalogue? A. Yes.

Q. Is this one type that, as an engineer, you would understand were to be used at the point by the legend: Diaphragm Valve, on Figure 1 of the patent in suit?

A. Yes, they are approximately what I had in mind. [1412]

\* \* \* \* \*

Q. By Mr. L. S. Lyon: Is the Roots blower, as you know it today, any different from the Roots blower as you knew it in 1928?

Mr. Foster: Objected to as immaterial.

The Court: No, I think it is perfectly proper. He can answer that question, if he knows.

A. Yes, I know that the Roots blower, along with most of these rotary positive pressure types of machines, have [1414] had a capacity to work at increased pressure, very much increased, due to the advance in the mechanical art, of the balancing of the heavy rotating element, to better machined surfaces, so that we are able to get contact and run at higher speeds. How far that advance had gone at that particular date, 1928, I can't state positively. I have a very definite impression that they were, up to that time, used pretty much as low pressure devices.



(Testimony of William Howard Clapp)

I know that the last edition of the Mechanical Engineering Handbook gave the data on the pressure for the Roots blowers efficiencies, as I have stated.

Q. Professor, is it your testimony that you know that prior to 1928 the Roots blower would function only at pressures, say, up to 4 pounds, and would not function up to a pressure, say, of 1925 pounds?

A. No, I hadn't made any such statement.

Q. I am going to refer in my questions, when I refer to the Roots blower, as of the date of 1928. The Roots blower could function as a brake, could it not?

Mr. Foster: Objected to as indefinite.

The Court: I am not sure that I understand what you mean; that the Roots blower with which he was familiar in 1928, could function as a brake?

Mr. L. S. Lyon: Yes, as distinguished from an impeller.

A. I don't think I understand the question—function [1415] as a brake?

Q. First we will come to this diaphragm valve, which you have referred to, and which is called for in Figure 1 of the patent drawing. In the operation of such a diaphragm valve, the valve is regulated by a weight or spring, or something of the kind, so that if the pressure on the inlet side of the valve drops below a certain point, the valve will open and by-pass, holding back the line, and maintain a certain minimum pressure, will it not?

A. Not necessarily, no.

Q. Is that one way in which it could be operated?

A. No.

Q. How would such a device work when incorporated in the system shown in Figure 1 of the patent in suit?

(Testimony of William Howard Clapp)

A. The valve would work to permit pressure from the higher pressure side to the lower pressure side when the difference in pressure between the two sides reached a certain value, as determined by the set of the spring. [1416]

Q. So the diaphragm valve could function to maintain, in line 80, a minimum pressure of not more than the pressure in the gas holder, that is correct, is it not?

Mr. Miketta: May I hear the question again?

The Court: Read it.

(Question read by the reporter.)

A. In line 80 above the valve which is shown there, provided you had it closed.

Q. Or throttled? A. Yes.

Q. Isn't the apparatus shown in Fig. 1 of the patent in suit capable of operating under the following conditions: With a pressure of 75 pounds in line 80, up to the two unmarked valves, a pressure of 30 pounds between such valves and the exhauster 81, and a pressure fixed by the gas holder of approximately one pound, in line 83?

The Court: You have got the original exhibit. Let us put the letters on the three valves, and it is going to be very much easier to discuss it then. Has the patent in suit been introduced in evidence?

Mr. L. S. Lyon: Yes, here it is, Exhibit No. 2. For the purpose of clarifying the record as to the witness' testimony, with the court's permission, I will mark these two unlegend valves in line 80, as 80a and 80b respectively.

The Court: That will be fine. The one on the direct line is 80a? [1417]

Mr. L. S. Lyon: And the one on the line below—

(Testimony of William Howard Clapp)

The Court: That is closed off. You had better mark that 80c. We have a on the vertical, b on the horizontal, and c on the horizontal, is that right?

Mr. L. S. Lyon: I have only marked 80a and 80c. There are other valves here.

The Court: Are you going to refer to them?

Mr. L. S. Lyon: I don't believe so; not for this question.

The Court: Mark the diaphragm valve as 80b.

Mr. L. S. Lyon: The diaphragm valve is already marked 84, so we won't need to do that.

The Court: Read the question.

(Question read by the reporter.)

Mr. L. S. Lyon: I will amplify the question by identifying the two valves in the statement "up to the two unmarked valves" as "up to the valves 80a and 80c," now marked on Exhibit 2.

Mr. Foster: The question is objected to as indefinite in the use of the term "capable of operating," as not indicating whether it is a static condition, or at what stage of the operation, or whether as described in the patent in suit.

The Court: I think you can bring that out on redirect examination. If the witness can answer, I think he is entitled to. [1418]

A. I think this question hinges on whether they plan to turn that diaphragm around, and make the high pressure side at the left and the low pressure side at the right, as different from what is shown in the figure by the arrows. The diaphragm valve 84—

Q. By Mr. L. S. Lyon: Is your answer to the question yes or no, Professor? If you can answer it, I wish you would.

(Testimony of William Howard Clapp)

A. Can we close valve 80, and throttle 80a, maintaining a pressure of 75 pounds in the snow chamber, provided there is a high enough inlet pressure, and have an exhauster which would work in reverse from what is shown in Fig. 1, so as to maintain the low pressure on the right-hand side, and the high pressure on the high side, and then by-pass through the diaphragm valve from the left to right?

Q. Maybe we have got too much in the question.

A. That's the way I understand the question.

The Court: I understood it that way, as long as you can figure out some machinery that would be capable of doing it, you are permitted to do so. Is your answer that it could be done in that way?

A. If there were at that time an exhauster capable of handling the pressure of one pound, or so, from the gas holder back into the line at 30 pounds, and if these valves 80a and 80c were of such a construction as to permit of operation with 75 pounds on the high side and 30 pounds on the low side, maybe it could be made to work. [1419]

Q. By Mr. L. S. Lyon: I want to clear up one thing about this exhauster, Professor; if exhauster 81 is represented by a Roots blower, of the type you have been referring to, can it be interposed in the line with 30 pounds between the valve 80a and the exhauster, and the one pound pressure on the opposite side of the exhauster to the gas holder, and function in that manner, the exhauster acting as a brake? [1420]

Mr. Foster: That is objected to, your Honor, as contrary to the teachings of the patent. The patent teaches this exhauster drives the gas—page 2, line 9—to the gas holder 12. It is assuming a fact not in evidence, and

(Testimony of William Howard Clapp)

contrary to the teaching of the patent. It assumes that the exhauster drives the gas in the opposite direction.

Mr. L. S. Lyon: If your Honor please, this is cross examination. The witness undertook to testify on direct examination that this apparatus, shown in Figure 1, was incapable of having a high pressure gas release, and that all gas releases would have to be low pressure, and, therefore, the pressure in the snow chamber would have to be low pressure. I want to cross-examine him on that subject.

Mr. Foster: I don't agree with his statement of the witness' testimony. The witness did testify to the operation of the apparatus in Fig. 1, as illustrated and described in the patent. Mr. Lyon makes a premise directly contrary to the express language of the patent as a basis for a hypothetical question. I object to it. The question contemplates a reconstruction of the apparatus illustrated, as well as an assumption contrary to the express teachings of the patent.

The Court: Of course, it might not prove anything. It is testing the witness' knowledge of the subject on cross examination. I think he is entitled to ask the [1421] question. It might not be of value, so far as the fact is concerned, if not within disclosures of the patent, but that is another thing. You may answer.

Q. By Mr. L. S. Lyon: Do you need the question read, Professor?

A. No. I am pretty sure I understood it, as stated. If at that time, as of 1928, there had been a positive type rotary blower capable of working between the limits of 1 pound and 30 pounds, and if that blower were set to operate from the gas holder side back into the line 80, and



(Testimony of William Howard Clapp)

if the diaphragm valve were adjusted opposite to what is shown in the arrows, then I would say that could be done.

(Short recess.)

The Court: Proceed.

Q. By Mr. L. S. Lyon: Professor, I want to clear up at this point about the necessity of reversing the motor or the blower under the conditions that we have been discussing. Is it your testimony that it would be necessary to reverse the motor or the blower 81 if you are going to change from a condition of operating the system for low-pressure gas draw-off or relief as compared to a high-pressure draw-off? And by "low pressure" I mean about 1 pound, and by "high pressure" I mean the triple point or slightly above, say, 75 pounds.

Mr. Foster: Objected to as indefinite. I don't understand it, your Honor—maybe the witness will—as [1422] to where the gas is drawn off from and as to whether the snowing operation is to take place in the snow chamber at the time contemplated in the question and the reference to the preceding question.

A. I should like, if I may, your Honor, to clarify my last answer there, which was made under the assumption that we are snowing in the snow tank; that the pressure is being built up there by throttling the valves 80a and 80c so that there can exist a pressure of 75 pounds or so in that line, and that then the exhauster might be operated as of that time, possibly, to maintain a pressure of 30 pounds between the exhauster and the line 80a with one pound pressure in the gas holder. That assumes a static condition, and, of course, it would not at all be possible for such a condition to obtain if we were not snowing and

(Testimony of William Howard Clapp)

if we did not have such a pressure in the gas chamber; that is, we are not supposing that it would be possible in such a system as outlined that that could operate dynamically to arbitrarily raise the pressure from 30 pounds on the exhaustor side of valve 80a to 80 pounds on the snow tank side. [1423]

Q. By Mr. L. S. Lyon: I agree with you, Professor, that it is implicit in all of our discussion that a sufficient gas was being produced in the snow chamber to build up or maintain these pressures we have been talking about between the snow chamber and the exhaustor. Now, with that understanding, can you answer my last question?

A. If you have 80 pounds, say, on the snow chamber side of valve 80a and 30 pounds on the other side, one would naturally assume that gas would be flowing from the high-pressure to the low-pressure side.

Q. And wouldn't it be possible for the exhaustor to be acting actually as a brake so as to produce the reduction in pressure from 80 pounds on the left-hand side of the exhaustor to the one pound on the right-hand side of the exhaustor?

A. Not unless the exhaustor was run in the opposite direction.

Q. Are you sure of that?

Q. By the Court: Opposite direction from what?

A. From what is intended by these arrows.

Mr. L. S. Lyon: I am not talking about—

Q. By the Court: The arrow on the vertical side opposite the valve 80a and the arrow on the horizontal side running from that line to the exhaustor?

A. 81; yes, sir.

(Testimony of William Howard Clapp)

Q. (Continuing) Controls the flow from higher to lower [1424] pressure, running up and to the right?

A. No; I don't believe it could be possible for an exhauster to work without rotation in the opposite direction from which the gas flow would be going from pipe 80 back to the gas holder.

Q. By Mr. L. S. Lyon: Let me see if I understand what you mean, Professor. We are talking about a condition where we have 30-pound pressure between the exhauster and the valve 80a; the gas is flowing to the exhauster; and the question is on the assumption that the pressure on the opposite side of the exhauster, between the exhauster and the gas holder, is one pound.

A. And the gas is flowing in which direction?

Q. It is flowing from the 30-pound side through the exhauster to the one-pound side. Couldn't that be true?

A. And we are using the exhauster as a brake, meaning that the exhauster—that these blowing elements are held stationary.

Q. This Roots blower to which we have been speaking is positively driven, is it not? A. It is.

Q. And having in mind that positive drive, under those conditions would not the exhauster function as a brake, without reversing the motor or the drive?

A. To maintain a pressure of 30 pounds on the left-hand side of the exhauster and a pressure of one pound on the [1425] other side of the exhauster?

Q. Correct.

A. Could it be run slowly enough and could there be so little leakage that that condition could obtain? I question it. Of course, the volumes of gas involved here, how small that exhauster was, would all be questions.

(Testimony of William Howard Clapp)

Q. Professor, we expect to show that that is actually the way the device was operated at the plant of the General Carbonic Company, and I want to be perfectly fair to you. Is it your testimony that that could not have been done?

A. No; I don't believe it could have been done and I don't believe it would have been done. Why not put a reducing valve in place of that exhauster?

Q. Well, my question is: You are prepared to say that it could not have been done mechanically with the Roots blower? A. I don't believe it could.

Q. Is it your testimony that, with the apparatus shown in Fig. 1 of the patent, a vacuum would be pulled on the snow chamber, or if the snow chamber was open, that air would be sucked into the line 80 by the blower?

Mr. Foster: Objected to as indefinite as not specifying the stage of the operations referred to.

The Court: Objection sustained.

Mr. L. S. Lyon: I think that specified the stage. I think I have specified the stage. I said, with the snow [1426] chamber closed or with the snow chamber open and no CO<sub>2</sub> being fed into the inlet.

The Court: Read the question, please.

(Question read by the reporter.)

A. Assuming the snow chamber was closed, that is, that that head 70 shown there has closed off the pressing cylinder 60, then I don't see how any air could be sucked into a closed system.

Q. By Mr. L. S. Lyon: Well, maybe I can shorten it up in this way: As I understood your testimony, Professor, you said that there was nothing in this system of

(Testimony of William Howard Clapp)

Fig. 1 which would preclude the exhauster drawing air into the system through the pipe 80 if the snow chamber was open to the entrance of air. Did you mean to say that?

A. Well, of course, you could close off the valves 80a and 80c completely.

Q. Could not the pressure regulator valve indicated by the legend "diaphragm valve" be set so as to maintain a pressure of up to one pound in the line 80?

A. Yes.

Q. How would you set the pressure regulator valve to do that?

A. You adjust the spring for a given pressure difference between the high-pressure and low-pressure sides.

Q. And if the low-pressure side became the line 80 and there was one pound pressure in the line 83, the pressure [1427]regulator valve would maintain a pressure of one pound in the line 80, would it not, so set?

A. If the low-pressure side were line 80—

Q. Yes. A. —valve 80a open, now—

Q. Yes.

A. —and the high-pressure side from the gas holder had a pound of pressure or so in it—

Q. That is correct.

A. —and the exhauster is working, drawing material from the left and delivering it at the right of the exhauster—

Q. That is correct.

A. —then it would be possible to set the springs so that the material, the gas on the side 83 could flow back to the side 84 to substantially the pressure on the side 83.



(Testimony of William Howard Clapp)

Q. And the gas flowing back from the line 83 would travel through the diaphragm valve or pressure-regulating valve in the direction indicated by the arrows—

A. Yes.

Q. —on the drawing under those conditions, would it not? A. Yes.

Q. And under those conditions a pressure approaching one pound would be maintained in the line 80 through the function of the pressure-regulating valve, isn't that correct? A. Yes. [1428]

Q. Have you ever seen an apparatus like Fig. 5 of the patent in suit in operation in the manufacture of dry ice?

Mr. Foster: Objected to as indefinite as to time.

The Court: Well, at any time.

Mr. L. S. Lyon: At any time.

Mr. Foster: Objected to as immaterial.

The Court: Objection overruled. He may answer yes or no. A. No.

Q. By Mr. L. S. Lyon: Professor, have you ever been in any plant where dry ice was being manufactured on a commercial scale? A. Yes.

Q. Where?

A. I have been down to the plant down at the southern end of Salton Sea, where they are manufacturing dry ice.

Q. Have you ever been in any of the plants here in town, the Liquid Carbonic plant, for example?

A. Not that I recall. I have made many inspection trips but I don't recall.

Q. Have you ever been in any plant where the Cole and McLaren apparatus of Fig. 5 was being employed?

A. No.

(Testimony of William Howard Clapp)

Mr. L. S. Lyon: Your answer was?

(Answer read by the reporter.)

Q. Except for this trip you made to the plant at Niland have you ever been in a plant where dry ice was being [1429] manufactured on a commercial scale?

A. I can't state definitely, but I think not.

Q. When did you make this trip to Niland?

A. A couple of months ago.

Q. Is that the only time you were ever there?

A. Yes.

Q. Will you refer to the patent to Cartier, Exhibit EE-1? What, if any, changes or additions would have to be made in the device shown in that patent in order to manufacture dry ice practically on a commercial scale, if you know?

Mr. Miketta: Objected to, your Honor, indefinite as to the use of the words "commercial scale."

Q. By Mr. L. S. Lyon: When I use that term, Professor, I am using it to distinguish from a laboratory experiment such as we all understand, that you can make dry ice in a paper bag or in your hat or in most anything — you can make some. I am talking about a practical operation.

The Court: You may answer.

A. Well, I should not limit myself to the proportions of the cylinder and so forth as shown in this Figure.

Q. By Mr. L. S. Lyon: Did you ever see one of these presses shown in the Cartier patent?

Mr. Foster: Objected to as immaterial.

The Court: Objection overruled.

A. No; I don't think so.

(Testimony of William Howard Clapp)

Q. By Mr. L. S. Lyon: Do you know what approximate size [1430] it would be when used as an oil press?

A. It might be made various sizes, depending upon what capacity they wanted, how much material they wanted to handle.

Q. What sizes are oil presses usually built for?

A. I think that would depend upon what they were pressing. They might be pressing cottonseed; they might be pressing olives or flax or —

Q. Do you know what kind of a press this was that Cartier was describing? I mean is it an olive press or what do you think it is?

A. The patent does not disclose and I had never heard of the patent until I saw this one.

Q. Based solely on what you can observe from looking at this patent, then, what changes, if any, or additions would have to be made in this device of the Cartier patent in order to practically manufacture dry ice in it?

A. This question of practical manufacture is a difficult one. We want an inlet opening.

Q. There is no inlet opening for CO<sup>2</sup> shown in this patent, is there?

A. No. To do it practically, I should say we should have an inlet opening.

Q. What other changes would you have to make?

A. I don't see any.

Q. Would you have to make any changes in the outlets or the drainage system? [1431]

A. No; I don't think so.

Q. Have you ever made any experiments to find out?

A. The patent states that there are —

Q. I am asking: Have you made any experiments with this device? A. No.

(Testimony of William Howard Clapp)

Q. To find out whether you could manufacture CO<sup>2</sup> in it, dry ice in it?

A. No. I was tempted to use that machine rather than the Stastney device, but didn't do it.

Q. Do you know whether or not any difficulty would be experienced in the oil drainage system freezing up if you attempted to manufacture dry ice in this Cartier device?

A. The patent states that there is a perforated plate cover with a filter cloth here. One could make a filter cloth of billiard cloth if he wanted to, which would be, perhaps not quite impervious to gas, but it certainly would be to liquid.

Q. You are not able to state, basing on any knowledge that you have, that if you could find one of these Cartier presses that you could actually manufacture dry ice in it practically?

A. I would be willing to bet you on it.

Q. Well, without putting any CO<sup>2</sup> inlet in it?

A. No; I would want an inlet.

Q. But you don't think you would have to make any other [1432] changes at all?

A. This is a very crude drawing. For instance, no stuffing-box is shown around the piston or anything of that sort.

Q. Well, let's assume that you were looking for one of these Cartier presses and you found one and it was an olive oil press. Have you ever seen an olive oil press?

A. Yes.

Q. You know about what they are like?

A. Yes; I do.

Q. Is this Cartier device or apparatus apparently adaptable for pressing olive oil?

A. Yes.

(Testimony of William Howard Clapp)

Q. And I see the inventor came from a certain district in France. Do you know what they press in that district? Maybe it is grapes for champagne.

A. Yes; I thought it was grapes.

Q. Grapes. Well, have you ever seen a wine press?

A. Yes.

Q. Is it your opinion that it would be satisfactory to take that wine press into a plant and use it for the manufacture of solid dry ice?

A. I would have to see the wine press before I could answer that general question.

Q. Well, let us turn to this patent to Sailor. Did you ever see one of those presses? [1433]

A. No; I think not.

Q. Have you ever seen any cotton presses, studied them at all? A. No.

Q. You don't know just what this Sailor device would actually be like if it was built for a cotton press, in any detail, do you?

A. Well, I think the patent discloses pretty well what it would be like. I think one could design a machine that would operate effectively from this disclosure.

Q. Did you ever design a cotton press? Did you ever design a cotton press?

A. Well, it is the same thing whether you design a cotton press or a brick press or something of that kind. You are dealing with pressures and proportions, sizes of cylinders. I don't know as I have ever designed a press for pressing cotton.

Q. Can you make bricks in a cotton press?

A. What?

Q. Can you make bricks in a cotton press?

A. You could; yes.



(Testimony of William Howard Clapp)

Q. What would they be like? A. Like bricks.

Q. Regular-sized bricks in a cotton press?

A. Well, it depends on the size of bricks, and the size of the press. [1434]

Q. Do you know what size a cotton press is?

A. Oh, I suppose the size of a cotton bale, maybe 3x6 feet, or two feet or something.

Q. If you made a brick in that press, it would be the same size as that cotton bale? A. That is right.

Q. Then, what do you mean when you say you could make bricks in a cotton press?

A. I mean you could take this type of machine, of the proper proportions and make brick in it.

Q. I am not asking you that. I am asking you: Could you take a cotton press, a press that was built for making cotton, and take it into a plant, a brick plant, and practically make brick with it?

A. No; that would be ridiculous.

Mr. Foster: I object to that and ask that the answer be stricken. May the answer be stricken?

The Court: Well, he said it would be ridiculous. I think that is a pretty good answer.

Q. By Mr. L. S. Lyon: Wouldn't it be just as ridiculous to take that cotton press of this Sailor patent and try to make dry ice in it? A. Yes; I think it would.

Q. Specifically, what changes, as far as you are able to tell us from your limited knowledge, would you have to make in this device as shown in this patent in order to [1435] convert it from a cotton press to an apparatus in which you could make dry ice?

A. You want an inlet opening. We will do away with those bale grooves and see that the low-pressure piston is a fair fit within the press. We could have exists for

(Testimony of William Howard Clapp)

CO<sup>2</sup> gas from the bale grooves in the top platen D. Nothing is said as to the size of those grooves. I think that might make a pretty fair chamber to make CO<sup>2</sup> snow and compress it.

Q. When operated as a cotton press the cotton, of course, is produced outside of the press, is it not?

A. Yes.

Q. There is no manufacture in the device of the material to be pressed in the sense of the production of solid CO<sup>2</sup> in the same chamber in which you press; that is true, isn't it?

The witness: May I hear the question?

(Question read by the reporter.)

A. I don't believe I understand that question.

Q. Well, you understand that in the operation of the apparatus shown in Fig. 5 of the patent that the CO<sup>2</sup> is solidified in the same chamber in which it is pressed?

A. Yes.

Q. Do you understand that? A. Yes.

Q. But in this Sailor patent the material to be pressed is prepared outside of the press, is it not? [1436]

A. If we had an inlet opening, it could be used as a snow chamber.

Q. Well, I am not asking you that. I am asking you: In the operation of this device as described in the Sailor patent, or as it would be used for pressing cotton. We all know that you do not grow the cotton in the cotton press.

A. No.

Q. You know that?

A. No; and we all know that we are not going to make the carbon dioxide snow and charge it into this press for pressing.

The Court: At this time we will take our midday recess.

(Whereupon a recess was taken until 2:00 o'clock p. m. of the same day.) [1437]

---

## AFTERNOON SESSION

2:00 O'Clock

The Court: Proceed.

WILLIAM HOWARD CLAPP

recalled.

Cross Examination, resumed

Q. By Mr. L. S. Lyon: Professor Clapp, will you turn to the Holden patent No. 530,526, Exhibit EE-3? Have you ever seen the apparatus described in that patent? A. No.

Q. Have you ever had any experience with the pressing of blocks from chip ice? A. No.

Q. I believe you stated that the chamber D and associated apparatus would have to be changed to enable such an apparatus to be used for the manufacture of dry ice. What changes would have to be made?

A. Chamber D?

Q. I may be wrong, but I thought you said the chamber D.

The Court: That is correct.

A. Yes, yes. I would provide an inlet opening into chamber D for liquid carbon dioxide.

Q. By Mr. L. S. Lyon: Is that the only change you would have to make in that freezing unit, in your opinion?

A. No; I don't see any other. [1438]

(Testimony of William Howard Clapp)

Q. Do you know whether or not the freezing unit as there shown would be inoperative, that is, it would freeze or congeal up if you attempted to introduce liquid CO<sup>2</sup>?

A. If what would congeal up?

Q. The freezing unit consisting of the parts on this diagram A, B, C, D, and F?

A. Snow would blow around into that space where the water is now, which is something of a jacket space, and would be carried off in the exhaust, as it is in most of the devices described in the patents.

Q. That is not exactly what I asked you, Professor Clapp. Where would you put this CO<sup>2</sup> inlet?

A. Well, you might put it down near the bottom of the chamber D, or you could even put it up nearer the top and have it point downward toward the outlet at L.

Q. The inlet pipe would have to extend into communication directly with the chamber D, would it not?

A. Yes.

Q. And you couldn't use this scheme by which they introduce the chip ice and float it up through the jacket around the chamber D?

A. No.

Q. When the solidified dry ice had been completed in that chamber in the process of transferring that product from the chamber to the press the ice would be open to the atmosphere, would it not, according to this apparatus?  
[1439]

A. When the valve L was opened to let the snow fall out into the pressing chamber?

Q. Yes. A. It would.

Q. By the Court: That is just a gate, isn't it, that L?

A. I beg pardon?

Q. That L is just a gate, isn't it?

A. Just a gate; yes.

(Testimony of William Howard Clapp)

Q. By Mr. L. S. Lyon: And the throat, the expanded end of the cone K extends out beyond the boundaries of the chamber D and open to the atmosphere, does it not?

A. Yes.

Q. Will you turn to the patent to Drummond, No. 533,871, Exhibit EE-4? This is an apparatus for expressing sap or juice from cane such as sugar cane, is it not?

A. Yes, sir.

Q. Did you ever see an apparatus like this as shown in the patent? A. I never did.

Q. Have you any experience with designing or operating apparatus for expressing juice from sugar cane?

A. No, sir.

Q. What changes, if any, would you have to make in this apparatus, in your opinion, in order to employ it practically for the manufacture of dry ice?

A. Again, an inlet should be provided into the pressing [1440] cylinder. I would take out those perforated pipes that are shown there for withdrawing the juice, that is, those are shown in addition to an outlet C, and, of course, I would change the proportions if you want to make a block of certain size. This is a big press. It shows stairs going up there. You wouldn't make —

Mr. Foster: May the witness finish his answer?

The Court: Were you through?

A. You wouldn't make carbon dioxide ice in the sizes that it is now made commercially in that press.

Q. By Mr. L. S. Lyon: In your opinion, you could not take a sugar cane press that had been built in accordance with this Drummond patent and move it into a factory and successfully manufacture dry ice on it without making changes in the machine, is that correct?

A. That is right.



(Testimony of William Howard Clapp)

Q. Will you now turn to the patent to Gaylord, No. 760,191, which I think is Defendants' Exhibit EE-6? Did you ever see an apparatus like that disclosed in this patent?     A. No.

Q. Without change would it be possible to manufacture any dry ice products in this device, except pipe stems?

A. Certainly.

Q. Could you manufacture commercial sized blocks of ice as they are shipped in commerce without changing this apparatus?     A. No. [1441]

Q. What changes would you have to make in the apparatus in order to manufacture commercial size blocks of dry ice?

A. Well, this, like the preceding patent, shows no inlet. There is an outlet which can be made of variable capacity by withdrawing the cap marked 13. You probably would not want to use a pipe stem mold in there, which is just one of many devices that may be put in a standard mold container such as that one marked by — let's see the number — No. 5 in Fig. 2.

Q. Professor, do you know of any dry ice products on the market or that have been on the market that could be made in this mold without change, except the pipe stems described in this patent or these caustic pencils that have been referred to here?

Mr. Foster: That is objected to as indefinite. I don't understand it. Possibly the witness does.

The Witness: I don't understand it.

Mr. L. S. Lyon: I think the question is perfectly plain.

The Court: Read the question, please, Mr. Reporter.  
(Question read by the reporter.)

(Testimony of William Howard Clapp)

The Court: You may answer.

A. The pipe stems are not made of dry ice.

Q. By Mr. L. S. Lyon: Well, I understood you to say you could make pipe stems out of dry ice, following this patent. Did I misunderstand your testimony?

A. I did not intend to make any such statement.

[1442]

The Court: Well, it is just that you are talking about two different things. You mean the dry ice in the form of pipe stems; and there was some testimony that those were used for local anesthesia by medical men.

A. No; that was the pencils as described in the Julius and Flemming patent.

Q. Couldn't you make a pencil out of this, instead of of pipe stem, in this mold?

A. Using a different form of mold.

Q. Pardon? A. Yes.

Q. By Mr. L. S. Lyon: But other than that, you do not know of any commercial dry ice product that could be made in this device without changing the device?

A. No. In most of these cases you would probably change proportions.

Q. Well, you would have to do more than change the proportions in this Gaylord device in order to make anything else, wouldn't you? A. I said so.

Q. And you have referred to an outlet for the gas. Would you not have to incorporate some outlet which is not shown in the patent if you were to discharge the gas from the pressing chamber while the material was being pressed? A. No, I don't see why.

(Testimony of William Howard Clapp)

Q. What outlet would you use for that purpose,—what [1443] outlet shown in the patent?

A. The patent states on withdrawing the plug 13 the gas may be permitted to escape.

Q. Where you are compressing the material in front of the barrier 21, the aperture plate 14, I think the number is, there would be no provision for the escape of gas, would there? There is none shown in this device.

A. Would you read the question?

(Question read by the reporter.)

Q. If the question is not clear, Professor, I will be glad to restate it.

A. The only way gas could escape would be going down through the press block and out at the outlet at 13.

Q. Have you sufficient experience and knowledge in the manufacture of dry ice to know whether or not a gas outlet limited in that manner would be sufficient and satisfactory?

A. I would not think it would be the best way to do it, if you wanted to get solid blocks in which the gas had been quite excluded.

Q. You don't actually know of, or are not sufficiently informed, to have any definite opinion one way or the other, whether it would be sufficient, is that correct?

A. I say it should be possible to mold dry ice by making the changes that I have indicated. I do not say you can make it commercially with that sort of a machine.

Q. Wouldn't you incorporate a gas outlet for the chamber [1444] in which the product was being pressed?

A. That is the chamber D?

Q. Yes. A. Yes, preferably.

(Testimony of William Howard Clapp)

Q. Have you ever observed the manufacture of dry ice in which the ice has been formed and pressed with no gas outlet or means for the escape of gas, except through the block itself?

A. No; I have seen blocks of dry ice which have been compressed under considerable gas pressure. I know they go to pieces.

Q. In this apparatus shown in the Gaylord patent is the dry ice solidified in the apparatus, or is it solidified in some other apparatus and introduced in solid form into this apparatus?

Mr. Foster: The question is objected to as indefinite. It is not directed to the disclosures of this patent, or anything else.

The Court: I did not understand it. Read it.

(Question read by the reporter.)

The Court: You may answer.

A. Neither. It is a device for pressing amber or ambroid.

Q. By Mr. L. S. Lyon: In this device in the Gaylord patent, where is the amber made, in this apparatus, or some other apparatus? [1445]

A. No, the amber occurs in nature. It is put in the mold at d in powdered form. It is heated with elements shown there, 18 in Fig. 1, which certainly would not be done with dry ice.

Q. Will you turn to the Holden patent No. 876,352. Defendants' Exhibit EE-7. This is another machine for making chip ice. What changes would you have to make in this machine, in your opinion, in order to manufacture dry ice in the machine in a practical way?

A. Changes in the proportion of the inlet valve and probably the outlet.

(Testimony of William Howard Clapp)

Q. Any others? A. No.

Q. Will you identify for us the inlet valve which you say would have to be changed?

A. This is a Corliss type valve, shown in sections, in 5 and 6.

Q. What changes would have to be made in that valve?

A. I would substitute a regular inlet with a nozzle, as is used in CO<sup>2</sup> devices.

Q. Would any change have to be made in the position of that inlet to enable you to manufacture dry ice practically in this machine, do you know, if you have an opinion?

A. This machine is shown as a horizontal machine. Preferably I would put an inlet at the top. If we took one of these cylinders and considered it as a vertical cylinder, [1446] I think the position of the inlet would be all right.

Q. Among other things then you would stand this machine on end, is that right?

A. That's right, which it could be, around this way.

Q. Can you tell us, if no change is made in the position of the inlet, and the machine was set up horizontally, as shown in the patent drawing, what success you would have in manufacturing successive blocks of dry ice in the machine?

A. I think it would be very effective.

Q. Have you given any thought to whether or not the bottom inlet for liquid CO<sup>2</sup>, in the relative position there shown, would function for the operation of the machine with successive blocks?

A. Yes, I think it would. I would prefer to incline it toward the forward end of cylinder 4.



(Testimony of William Howard Clapp)

Q. Wouldn't the inlet freeze up along with the block in the machine? A. No, I don't believe so.

Q. Have you given any thought to that? Are you making that as a statement that it would not?

A. Well, I was thinking of the outlet of the patent in suit, which comes out through the position occupied by the press block. [1447]

Q. I am referring now to the inlet here, an inlet introducing the liquid CO<sub>2</sub> into the bottom of the machine, as to what would happen if you did that, and then tried to make a succession of blocks in the machine?

A. You might get a plug of snow in the block, and as soon as the valve is opened it would blow it out.

Q. Have you ever had any experience with a machine having a bottom inlet for the liquid CO<sub>2</sub>, in which you are trying to make blocks of dry ice? A. No.

Q. Would you have to make any change in the gas outlet shown in the Holden patent to operate the machine practically for the manufacture of dry ice blocks?

A. You might want to put a valve on it, or proportion it according to the inlet and capacity of the apparatus.

Q. Can you tell us what you would need to do? You have said you might want to do these things. Can you tell us what in your opinion should be done?

A. No dimensions are given in this drawing. These things are all relative.

Q. Not having seen a machine of this type actually as it would be made for the pressing of chip ice — I don't know whether you can answer the question or not — do you think that you could take such a machine, as it would be made for the manufacturing of chip ice, and bring it into [1448] a factory and operate the machine success-

(Testimony of William Howard Clapp)

fully in the manufacture of dry ice, without making a change in the gas outlet?      A. No.

Q. You probably would have to, would you not?

A. In size, do you mean?

Q. You would have to at least change the size?

A. You might.

Q. How about these perforated liners, or the perforated liner in this machine? Do you think you could leave that in there and successfully manufacture dry ice blocks?

A. No proportion is given to the openings in these liners at all. The space between the liners and the cylinder, pressing cylinder, is a jacket space.

Q. Then would it depend upon these proportions whether you would have to remove that perforated liner or not to successfully operate the machine for the manufacture of dry ice?      A. I don't believe so.

Q. What was the point of your telling us that there are no proportions given or sizes given?

A. Speaking of the pipes, the inlets and outlets?

Q. I am speaking about the perforated liner.

A. Yes.

Q. You don't think it would make any difference if the perforated liner was in the machine or not if you tried [1449] to manufacture dry ice in the machine?

A. I believe those perforated liners are shown in the following patents, are they not?

Q. They are shown in patent No. 730,018, according to line 44, page 2 of this patent, and they are shown in patent, 1,054,772.

A. Yes, in Figures 9 and 10.

Q. Have you given any thought as to whether or not those would interfere in any way with the manufacture

(Testimony of William Howard Clapp)

of dry ice blocks if you tried to use the machine for that purpose? A. I have.

Q. Did you make any tests? A. No.

Q. It is your opinion it would not make any difference, or that they should be removed?

A. I don't believe it would make any difference, or that they should be removed.

Q. Will you turn now to the Holden patent just mentioned, 1,054,772, Exhibit EE-10. Does the testimony you have given with regard to the necessity for changing the inlets and outlets in the prior Holden patent just mentioned apply equally to the apparatus shown in this patent 1,054,772, if you attempted to operate the latter for the manufacture of dry ice blocks?

A. I believe I noted a difference in this patent from [1450] the preceding one in that the sliding gate is shown as having a provision — that is, No. 76 in Figure 2, in sections; the gate is shown as having a provision for the withdrawal of any water which may get behind the piston, and no such provision is made or described for the press in the preceding patent.

Q. Do you mean by that that it would not be necessary to make any change in this apparatus of this patent 1,054,772, for the escape of gas, if you were attempting to manufacture dry ice blocks with the machine?

A. Other than those that I described in the preceding patent?

Q. Yes. A. No.

Q. You would have to make those same changes, would you not, in this apparatus?

A. I said changes in inlet and outlet proportion?

Q. Yes. A. Yes.

(Testimony of William Howard Clapp)

Q. Will you turn to Osborne patent No. 1,104,920, which is Defendants' Exhibit EE-11. This is an apparatus for making water ice, is it not? A. It is.

Q. Did you ever see this apparatus? A. No.

Q. Did you ever have any experience making water ice [1451] in an apparatus of that kind? A. No.

Q. As I understand it, your testimony applies to all these references other than Stastney; you haven't had any experience in trying to make dry ice with any of them?

A. No.

Q. In order to make dry ice with the apparatus of this Osborne patent, what changes would you have to make, in your opinion?

A. I would plug up these holes 13, that are shown there. I would take off that spraying device and substitute a nozzle at 15; and otherwise I wouldn't make any change.

Q. Wouldn't you have to make a provision for the gas outlet in the press?

A. It goes out through the pipe 9.

Q. In the press? I think you misunderstood my question.

A. No, we are snowing in chamber 6.

Q. The pressing is done down below the slide 24, is it not? A. Yes.

Q. And there is no provision for the gas outlet from that chamber during the pressing, is there? A. No.

Q. Wouldn't you have to have one?

A. No; that is, a lot of the preceding art speaks of [1452] compression of the snow without providing a gas outlet.

(Testimony of William Howard Clapp)

Q. Have you any experience with the production of blocks of dry ice under those conditions?

A. You probably would have a better block if you made provision for gas to escape during the pressing of the snow, which might be done with a cylinder that leaks a little bit — I mean a piston that leaks.

Q. You know from your technical knowledge and what you have heard here in the court room that provision should be made so that the unsolidified CO<sub>2</sub> can escape and not be pressed into the block, to avoid the block being unstable or exploding; isn't that your understanding?

A. Well, that is certainly true if the material is compressed with a relatively high pressure of gas in the chamber; but if the pressure is allowed to drop down to atmosphere and then the snow is compressed, I don't believe that the additional withdrawal of the gas would amount to much.

Q. You say that you would plug up these holes 13 in this Osborne device. Why would you do that?

A. Well, they are not needed in the operation.

Q. Would they interfere with it?

A. Oh, I think that that whole bustle pipe 11 would probably fill with snow and it would be melting, and it would not be as efficient.

Q. Would you retain this air system and the apparatus [1453] for circulating air in this device? A. No.

Q. If you were going to use the device for the manufacture of blocks of CO<sub>2</sub>? A. No.

Q. What would you do with that?

A. Why, I would connect the outlet 9 to the exhaust end or the recovery end of the carbon dioxide system.



(Testimony of William Howard Clapp)

Q. Then, you would substitute a CO<sub>2</sub> compressor system for this air-circulating system as shown in this patent?

A. Yes. I would not attempt to make carbon dioxide ice out of air, and so —

Q. As a matter of fact, you would have to dispense with this circulation of air that is described in this Osborne patent in order to make CO<sub>2</sub> blocks practically, would you not?

A. Yes, sir.

Q. Will you turn to this Stastney patent, 1,288,255, and particularly, first, I want you to make some comparisons of this model, Defendants' Exhibit II, with the specifications and drawings of this patent. [1454] In mentioning differences yesterday, I do not believe you said anything about these tie rods on this model at the four corners.

A. I believe I said that they took the place of the bolting device shown as No. 19 on the patent.

Q. And how much pressure do you think you could safely rely upon withstanding if you relied on those wing bolts, thumb bolts, as shown in the Stastney patent?

A. It depends on the size of the bolts and the size of the cylinder.

Q. Did you ever see a device like this Stastney patent, a soap manufacturing device?

A. I never did.

Q. Have you ever had any experience in designing or operating apparatus for the manufacture of soap?

A. I made a few designs, tentative, for Proctor & Gamble down here a number of years ago. It did not involve a press.

(Testimony of William Howard Clapp)

Q. What do you think would be the probable dimensions of the Stastney device if it was made for the purpose of molding and cutting of soap, if you have any opinion?

A. It would depend upon the capacity wanted. I should say that we might make this inner rectangular chamber 6, oh, say, 14 or 15 inches wide and 3 feet long.

Q. You think that is about what it would be in the soap business?

A. Well, if you wanted a greater capacity, you might [1455] prepare for it.

Q. I understand that, but within the requirements of the soap industry, will you tell us the approximate sizes?

A. Yes; I think that would be a reasonable size.

Q. Assuming that you could find one of the devices shown in this Stastney patent which had been manufactured for use in the molding and cutting of soap, is it your testimony that, in your opinion, you could take that device and without change take it into a factory and operate it practically for the manufacture of CO<sup>2</sup> blocks?

A. Yes. Changing the size of the inlet, now.

Q. I said, without any changes.

A. Without any change; no.

Q. What pressure would the apparatus be designed to withstand if the apparatus was of the type that it would be made for molding and cutting soap? Can you tell us that?

Mr. Foster: Objected to as indefinite unless the density and quality of the soap desired is specified in the question.

Mr. Miketta: Further objected to as referring to a machine of a certain type, not the machine illustrated in the drawings.

(Testimony of William Howard Clapp)

Mr. L. S. Lyon: I will limit it to the machine shown and described in this Stastney patent. That is what I intended it to be.

The Court: With that limitation, you may answer.

[1456]

A. I don't know what pressures would be applied to solidify soap under those conditions. It might be only 10 pounds per square inch and it might be 50 or more pounds per square inch. There would be no difficulty in designing a machine as shown here to withstand either pressure.

Q. By Mr. L. S. Lyon: That is not my question, Doctor. My question is, in the first place, do you know what pressures are encountered or would be encountered in an apparatus of this kind if designed for and used for the molding and cutting of soap?

A. Not definitely; no.

Q. You say it might be 50, but it might not. You haven't any basis for your statement that it might be as high as 50, have you?

A. No. I am thinking of the consistency of the liquid and the desire to hold it together during this solidifying operation when the constituents give up their water, their liquid at a different rate. I should think 50 pounds might be high enough; it might be a hundred.

Q. It might be a great deal higher than any pressure that ever is encountered in such an actual operation, so far as you know?

A. It might be.

Q. 50 pounds might be a great deal higher than any actual pressure that the device is called upon to withstand when used for molding and cutting soap; isn't that correct, [1457] so far as you know?

A. That might be.

(Testimony of William Howard Clapp)

Q. Well, do you know whether or not such a device constructed for and intended for use in cutting and molding soap could safely be brought into a plant operated for the manufacture of CO<sup>2</sup> blocks without any reinforcement or any additional additions to it to withstand CO<sup>2</sup> pressures?

Mr. Foster: That is objected to unless the type of CO<sup>2</sup> blocks and solid carbon dioxide it is contemplated to be formed is specified in the question.

Mr. L. S. Lyon: I am talking about all of them.

The Court: Make it any type. You may answer.

A. There is no difficulty in the design of that device.

Mr. L. S. Lyon: Will you read the question to the witness, please? I move to strike the answer.

The Court: It may be stricken.

(Question read by the reporter.)

Mr. Miketta: That is objected to, your Honor, as calling for a conclusion of the witness regarding a hypothetical machine. He does not state its state of decrepitude, age, or thickness of walls is not known.

A. If I had ever seen a Stastney machine, I think I could answer that question quite definitely.

Q. By Mr. L. S. Lyon: But never having seen one, you can't very well answer, is that correct?

A. No; I have to hedge. [1458]

Q. Well, I don't want you to hedge, Doctor. There was an addition incorporated in Exhibit II as a safeguard because of the pressures developed in the demonstration here in court which does not appear in the Stastney patent, and that is in the presence, for one thing, of that gasket under the top plate, isn't that right?

A. Well, as an engineering device there is certainly a gasket under the top plate 18.

(Testimony of William Howard Clapp)

Q. Well, you do not see any in the drawing, do you?

A. No; I don't see any in the drawing.

Q. You do not see any described in the specification, do you?      A. No.

Q. And you would not need one necessarily for the molding and cutting of the soap, would you?

A. Yes; I think you would.

Q. Why?

A. Well, you would have water leaking out when you started to press all around the outside edges of the device.

Q. Have you ever seen the operation of the apparatus in the soap plant?      A. No; not this apparatus.

Q. Do you think that they objected to water flowing around the apparatus in a soap plant, or don't you know anything about that?

Mr. Foster: Objected to as calling for a conclusion of [1459] the witness.

A. I think anyone around a plant would object to having sloppy conditions of operation.

Q. By. Mr. L. S. Lyon: Have you ever been in a soap plant?      A. Yes.

Q. Wasn't there water flowing around the apparatus?

The Witness: Read the question, please.

(Question read by the reporter.)

A. No; very clean conditions.

Q. But you did have to have this gasket or use a gasket on this model, Exhibit II? And I show you the gasket here.      A. Yes.

Q. In order to guard against the pressures that were developed in the demonstration here in the courtroom, isn't that correct?      A. No.



(Testimony of William Howard Clapp)

Q. Why did you have it on there?

A. I didn't want to go to the expense of machining up surfaces to the accuracy required to make a metal-tight seal.

Q. You mentioned that you would have to change the Stastney apparatus that had been built for molding and cutting of soap if you were going to try to use it for the manufacture of dry ice by making a change in the inlet. What change would you have to make in the inlet?

A. I would put a nozzle in there, preferably between the valve 10 and the device. [1460]

Q. What type of valve is shown in this Stastney patent here, can you tell, at 10?

A. No; I don't think it tells.

Q. You are unable to tell from looking at the drawing what type of valve that is, the valve 10?

A. This looks like a plug valve.

Q. Can you use a plug valve in controlling the inlet line to an apparatus in which you are solidifying liquid CO<sup>2</sup>, do you know?

A. No; probably would not.

Q. Probably would not use it, isn't that right?

A. No; I wouldn't say so.

Q. What did you mean "probably would not"?

A. Because there would be other valves which would be more effective.

Mr. Foster: Just a moment. May the witness finish his answer, please?

The Court: Yes.

Mr. Foster: Had you finished?

Q. By Mr. L. S. Lyon: Do you know whether or not plug valves are used in the CO<sup>2</sup> industry?

A. No; I wouldn't think they would be.

(Testimony of William Howard Clapp)

Q. Why not?

A. Well, because there are other valves which are more effective.

Q. Don't you know that a plug valve would freeze up and [1461] block off?

A. It would if we cracked it down to a very small opening.

Q. It is customary, isn't it, as you understand the CO<sup>2</sup> manufacturing industry or dry ice business to either use a nozzle or no valve at all?

A. To introduce the liquid carbon dioxide into the cylinder through a nozzle.

Q. Or else flow it in for the triple point operation with no nozzle or obstruction at all, is that right?

A. No; I wouldn't say so.

Q. Do you know?

A. As I understand your meaning of triple point operation, that we are letting this flow in to the cylinder under pressure conditions such that the material enters as a liquid?

Q. That is right.                      A. Yes.

Q. This much is true, isn't it, Professor, in your opinion, that this Stastney apparatus, when you brought it over from the soap factory, one of the things you would have to do to it if you were going to operate it for making CO<sup>2</sup> blocks would be to change that valve 10; you would not expect to find a valve on a soap molding —

A. No.

Q. — and cutting device that would be adapted for CO<sup>2</sup> [1462] operation?

A. No; and we didn't put one on our model.

Q. You have a different type of valve on your model, haven't you, from what is shown in this Stastney patent?

(Testimony of William Howard Clapp)

A. We connected this directly to the outlet of the carbon dioxide tank.

Q. And eliminated the valve 10?

A. Had the valve at the tank.

Q. Yes. You would also have to make some change in the size of this inlet, wouldn't you, as shown in the Stastney patent and as it would exist in a device for cutting and molding soap?

A. Yes, yes.

Q. And you would also have to make some change in the outlet at the top in this stop-cock arrangement?

A. Yes.

Q. You could not use that successfully for venting your gas if you were trying to make CO<sup>2</sup> blocks in the device?

A. We used a valve here which would operate pretty much the same as a stop cock. It worked effectively.

Q. But it is not a stop-cock, is it?

A. It is not a stop-cock; no.

Q. And you have changed the size of that gas outlet in your model as compared with this drawing of the Stastney patent, haven't you?

A. Relative to the cylinder size; yes. [1463]

Q. And relative to the inlet size? A. Yes.

Q. In the Stastney patent the gas outlet is only a fraction of the area of the inlet, isn't that correct, a small fraction?

A. Yes.

Q. What are the relative areas of the outlet and inlet in this model that you demonstrated here in court?

A. Well, the outlet is a  $\frac{3}{8}$ -inch pipe, all that piping is  $\frac{3}{8}$ -inch, and that is the approximate internal diameter size, and the inlet for liquid CO<sup>2</sup> is, I believe,  $\frac{5}{32}$  of an inch.

(Testimony of William Howard Clapp)

Q. When you brought this device over for the manufacture of  $\text{CO}^2$  from the soap plant that was made under this Stastney patent, you would also have to make a change in the proportions and the size of the piston, would you not? A. No.

Q. Could you use a piston of the size and the characteristics shown in this Stastney patent practically for the manufacture of  $\text{CO}^2$  blocks?

A. I see no reason why not.

Q. In the Stastney patent what fluid is used for actuating that piston? A. Compressed air.

Q. What would happen in a  $\text{CO}^2$  manufacture if you tried to use compressed air in the manner shown in this Stastney [1464] patent?

A. It would not be very effective.

Q. What would be the matter with it?

A. Well, if it leaked beyond the rings of the piston at all, it would blow up through the compressed ice and that would not be good.

Q. You did not use compressed air in your demonstration here in the court room, did you?

A. No. We used  $\text{CO}^2$  gas.

Q. And there is no description or no instruction to do that in this Stastney patent? A. No.

Q. If you were trying to employ this Stastney apparatus in the manufacture of  $\text{CO}^2$  blocks, how would you get the block out after it was formed, if it was formed?

A. Using this air means on the one piston would not be so good. We got our little block out by just releasing a little pressure into the pipe 16 and raising the block; but that would not be as effective as if we had a piston rod which was a controllable means. It is just a question of means of operating that piston.

(Testimony of William Howard Clapp)

Q. Practically, if you were attempting to use a device for the manufacture of CO<sup>2</sup> blocks, you would have to add some controllable hydraulic means; you could not rely on just flowing air behind the piston, could you?

A. I expect it could be done, but I wouldn't say it was [1465] the preferable way to do it.

Q. You are quite sure it would not be satisfactory, aren't you?

A. Well, piston rings wear and eventually, if air leaked up through, why, that is objectionable.

Q. What would be the result of applying air to the cold wall of the chamber behind the piston if you were using this device in the manufacture of solid CO<sup>2</sup> blocks?

A. You are thinking of the heat effect, the thermal effect.

Q. Would not moisture condense on the wall of the chamber and freeze?

A. On the inside of the chamber?

Q. Yes.

A. It probably would. [1466]

Q. Then how would you get your piston down to start your next block in this apparatus as shown in the Stastney patent?

A. It would depend upon how much moisture froze on the walls. If this device was down in Imperial Valley, I don't know as there would be enough moisture freeze on the walls to make any difference.

Q. Well, you don't know one way or the other, do you, about that? A. What?

Q. You are just speculating about that, aren't you?

A. I have stated that I don't think this would be the most effective means of compressing the block as a means of operating the piston.



(Testimony of William Howard Clapp)

Q. Well, you haven't answered my question. If moisture did condense on the walls, the inner wall of this chamber behind the piston, when you were forcing the piston up to eject the block or to press the block, then there would be a probability or a possibility of the piston freezing, wouldn't there? A. It might.

Q. At least, there would be a problem of getting it to come back down, wouldn't there?

A. It would depend upon the humidity of the air and the length of time it took to do the pressing.

Q. This patent does not show any way of getting the [1467] piston down so as to start another block, does it, after you have made one block? A. No.

Mr. L. S. Lyon: If your Honor please, if you would care to have our adjournment, I think the witness and I would both be better off before we take up another patent.

The Court: Yes. Very well.

(Short recess.)

Mr. Foster: We have a witness here from out of town, whose testimony would take only a few minutes. I think it highly probably, if I make an offer of proof as to what the witness I believe will testify to, that plaintiffs' counsel will stipulate if called he would so testify. May I make such offer at this time, your Honor?

The Court: Yes.

Mr. Foster: Would the court prefer that the witness leave the court room while I make the offer?

Mr. L. S. Lyon: That is not necessary, your Honor.

Mr. Foster: The witness, W. L. Benson, if called as a witness on behalf of defendants, would testify that he made the two sheets of drawings which are in evidence

as Plaintiffs' Exhibits 3 and 4, and that all of the legends and lines thereon were made by him, and that the initials W.L.B. appearing upon the drawings, are his initials; that he made the drawings somewhat reductantly, being extremely busy, because he could find no draftsman to take to the [1468] plant to make them;

That there appears upon these Exhibits 3 and 4, in red, the legends "Vent Pipe" and "Valve", and that there are appearing upon the original of the drawings from which these Exhibits 3 and 4 were made, changes indicating the presence of vent valves to atmosphere, on both the H.P.M. and Frick presses, and legends appropriately identifying them as vent opening or vent line; and that these legends were not upon the original drawings, of which Plaintiffs' Exhibits 3 and 4 are prints, nor were the vent openings indicated, for the reason that when he was making the drawings he did not consider them important to a showing of an overall illustration of the machine, and they were not put on for that reason, and through oversight. That the vent openings and vent pipes now indicated upon these original drawings of which Plaintiffs' Exhibits 3 and 4 are prints, before the additions were placed thereon, were on the H.P.M. press when it was installed, and have been continuously on the press ever since, and now are there, and have been continuously used for venting the chamber to atmosphere before pressing. That the air vents appearing upon the drawings now as appearing upon the Frick press, were there when he first saw the Frick press, have been there ever since, and are now, and have been continuously used for venting the chamber to atmosphere before pressing.

That the vents were on both machines at the time plaintiffs' representatives had their inspection of the two [1469] machine.

In one other respect Defendants' Exhibit 4 of the H.P.M. press was not correct, that is, to scale, and that the lower platen was not shown to be approximately  $1\frac{3}{4}$  inches thick, and the chamber should have been shown a little more accurately to scale, being 20 by 20, horizontal dimension, with the lower plate or boss about  $\frac{1}{4}$  of an inch less in horizontal dimensions.

That the note appearing upon Plaintiffs' Exhibit 4, "Open chamber while pressing", note 3, meant that the chamber was open to atmosphere through the vent pipe and the lowering of the platen while pressing operation was performed; and the note appearing upon Plaintiffs' Exhibit 3, which he placed thereon: "Upper ram open during pressing period", meant the upper platen of the Frick press was raised, permitting the escape of gas during the operation of that press.

I might state, your Honor, that the drawings with the changes I have referred to, which are now present upon the original drawings I have in my hand, were known to plaintiffs, prints of the original drawings having been handed to them.

Mr. L. S. Lyon: May I inquire if this witness is not a defendant in this case?

Mr. Foster: He is one of the defendants. At the time he made the drawings, he was not one of the defendants, because the supplemental complaint had not then been filed. [1470] He was then an employee of the defendant corporation.

Mr. L. S. Lyon: It seems to me that the statement on the matter, which counsel for the defendants seems to think so important, they should not ask us to stipulate to. I don't understand he is asking us to stipulate that those are the facts. If the defendant could remain in attend-

ance tomorrow, we will consider this rather long statement of counsel and advise the court as to whether we care to cross-examine or not. I am willing to stipulate, if we have that right to cross-examine, if we find we need it, that the defendant would so testify, without stipulating to the facts.

Mr. Foster: That is all I ask; I am not asking you to stipulate that they are facts, Mr. Lyon, but Mr. Benson, being available in court, and put under oath, would so testify. Is that stipulated to?

Mr. L. S. Lyon: No, it is not stipulated to, except, as I say, with the reservation that the defendant will remain in attendance, and then we may consider this statement when we get the transcript, and if we desire, the defendant will take the stand for cross-examination.

The Court: Is Mr. Benson in the court room?

Mr. Foster: Yes, he is here.

The Court: Will you be available tomorrow morning at 10 o'clock?

Mr. Benson: I can. [1471]

Mr. Foster: I might state this, your Honor; the reason for my asking the offer at this time, I did not like to interrupt Mr. Lyon's cross-examination, but this witness has just brought in yesterday a carbon dioxide well, late yesterday, and has impressed upon me the necessity or desirability of his being back to the Niland area as quickly as possible. While I appreciate Mr. Lyon's desire, and probably would have a similar desire were our positions reversed, for opportunity to cross-examination, I wonder if he would feel that he could give that cross-examination now. Would it inconvenience you greatly, Mr. Lyon?

Mr. L. S. Lyon: Your Honor, I am very anxious to use the time, and I am going to be here until tomorrow night with the Professor, and complete his examination.

The Court: When do you plan to be through your case?

Mr. Foster: The direct examination?

The Court: Today is Wednesday.

Mr. Foster: Assuming this offer of proof eliminates the necessity of examining Mr. Benson on direct examination, then the remaining direct examination will require, as nearly as we can estimate, not to exceed three hours.

The Court: If this man has a well coming in, would it not be more convenient for you to come back here next Tuesday? Couldn't we just give you time to consider it, and then if you want to cross-examine him, he can be notified, and he can be here Tuesday? [1472]

Mr. L. S. Lyon: We will let them know. Maybe we won't want him. We can notify counsel.

The Court: Did you hear the statement Mr. Foster made here in open court?

Mr. Benson: Just now?

The Court: Yes.

Mr. Benson: Yes, I did.

The Court: Are all those statements true and correct?

Mr. Benson: Yes.

The Court: Will you swear this witness, please, Mr. Hooser?

(W. L. Benson was here sworn.)

The Court: Do you state that all the statements made by your counsel here are true and correct?

Mr. Benson: Yes, sir.

The Court: You will be excused until next Tuesday, unless you are notified you are further excused. You will be here at 10 o'clock next Tuesday morning prepared to be cross-examined by counsel, if they need to cross-examine.



ine you. If they don't they will let your counsel know before Friday morning, or by Friday morning, and your counsel will notify you. Otherwise, make your plans to be here Tuesday at 10 o'clock.

Mr. Foster: Will there be court Tuesday?

Mr. Miketta: That, I believe, is the 30th, and ordinarily it is a holiday. [1473]

The Court: I guess we can't hold court that day. Make it Wednesday, then. Is that satisfactory?

Mr. Benson: Yes.

Mr. Foster: What I was referring to in my outline of the testimony of Mr. Benson are these original drawings. May I have these marked, your Honor, as defendants' next exhibit?

The Court: They may be marked.

Mr. Foster: The H. P. M. press Defendants' Exhibit—

The Court: LL.

[Note: Defendants' Exhibit LL will be found in the Book of Exhibits at page 1577.]

Mr. Foster: The second one, being the Frick press. Defendants' Exhibit MM.

[Note: Defendants' Exhibit MM will be found in the Book of Exhibits at page 1578.]

Mr. Miketta: May the record also show, your Honor, that Defendants' Exhibits LL and MM were respectively Exhibits A and B appended to an amendment to the answers to the interrogatories filed in this court?

Mr. Foster: Several days before we began the trial.

Mr. Miketta: Yes.

Mr. Foster: Thank you, Mr. Lyon, for permitting the interruption.

The Court: You may proceed.

(Testimony of William Howard Clapp)

Cross-Examination

resumed.

Q. By Mr. L. S. Lyon: Will you turn, please, Professor, to Slate patent 1,546,681, Exhibit EE-15? There is no pressing means disclosed in this patent; is that correct? [1474]

A. There is no pressing means disclosed.

Q. And there is only one pipe which will serve both for the inlet of the liquid CO<sub>2</sub>, and the gas outlet; is that correct? A. That is correct.

Q. Have you ever seen a device such as shown in this Slate patent? A. No.

Q. Have you ever tried any experiments to see whether you could operate it, and what results you could get?

A. I testified I had never seen the device, so I could not carry on any experiments with it.

Q. What is this compressor for, shown in drawing, No. 17?

A. It is for the purpose of returning the exhausted gases after injection into the tank, or place of origin, from which they came. It might be a manufacturing plant, represented by No. 2 in the drawing.

Q. Does it operate constantly during the performance of the apparatus?

A. The patent description stating, starting the compressor first, and then opening the valves 5 and 3, and when a sufficient amount of liquid carbon dioxide has gotten into the device, so that we may know that it is liquid, as represented by the drawing, then valve 5 is closed and the compressor exhausts from the snow tank 14 back to the [1475] source of supply No. 2.

(Testimony of William Howard Clapp)

Q. Is the description in this patent adequate, so you understand how the device is to operate in all respects?

A. Yes, sir.

Q. And what it amounts to then is a snow tank with this pump and supply of CO<sub>2</sub>; is that correct?

A. I don't get the import of the question. Will you read that question?

(Question read by the reporter.)

A. That and the piping and valves are the elements of the combination.

Q. Will you turn to Slate patent No. 1,546,682, Exhibit EE-16. There is no pressing of the solidified CO<sub>2</sub> in the apparatus shown in this patent; is that correct?

A. There is no pressing shown, yes, sir.

Q. Will you turn now to the patent to Kochenderfer, No. 1,631,037, which is Exhibit EE-17? This is a patent for use with boiled garbage, is it not? A. Yes, sir.

Q. Did you ever see a garbage apparatus of that kind?

A. I never did.

Q. Did you ever make any experiments with such an apparatus upon garbage?

A. I think I answered that question the first time.

Q. According to your understanding of what this device would be, if actually built for handling garbage, what would be the diameter of the chamber 4? [1476]

A. It would depend upon how much garbage you were handling. It would certainly be a large device.

Q. Can you give us your opinion as to what that diameter would be probably?

A. It might be anywhere from 2 to 3 or more feet in diameter.

Q. In your opinion, if the device was built for the purpose of operating on dry garbage, could you take that

(Testimony of William Howard Clapp)

device into a plant and use it practically for the manufacture of dry ice blocks without making any change in the device? A. No.

Mr. Foster: That is objected to as assuming facts not in evidence, and contrary to the evidence; in the use of the term "dry garbage".

Mr. L. S. Lyon: I should say boiled garbage instead of dry garbage. Excuse me. What changes would you have to make, in your opinion; Professor?

A. If we were to use an inlet at the bottom of cylinder 4, as shown in Fig. 2, where the pressing plunger has been shown in its elevated position, as raising the material to the top, I would put the inlet above the position of the ram when it is in its downward position; that is, the ram 3. It is now shown in an upward position. I don't see any other relevant changes.

Q. Is there any satisfactory gas take-off shown in the [1477] patent drawing, or description in the specification, or would you have to provide such?

A. The patent doesn't disclose anything about the proportions of the openings there at the top. There is an annular groove in the cylinder marked 31. There is an annular groove in the closure cap marked 30, and these grooves coincide when the closure cap is in sealed position on the top of the cylinder 4. The patent states that there is an annular space between the cylinder walls and the lower projecting lip of that closure cap, but it says nothing about the size of that space.

Q. That structure—

Mr. Foster: Just a minute. I don't believe the witness had completed his answer about the fluid outlet.

The Court: You may continue.

(Testimony of William Howard Clapp)

A. So far as I can see from the language of the patent, the outlet for the gas through what we might take as an opening 25 in Fig. 1, I believe might be entirely unrestricted up to that outlet.

Q. By Mr. L. S. Lyon: Is that clear from the patent, or is that just a possibility? Is the patent indefinite on that?

A. The patent doesn't disclose the size of the spaces there, nor the size of the outlet pipe.

Q. And it does not actually disclose definitely any of that structure, does it? A. No. [1478]

Q. What is the function of the sluice gates 24, as described in this Kochenderfer patent?

A. I haven't read the claims of it.

Q. I think you misunderstood me, Professor. I said the sluice gates 24; not the claim 24.

A. I beg your pardon. I have a bronchial cold, and it has affected my hearing. I have to apologize.

Q. I am sorry. They are shown in Fig. 1.

A. 24 is a valve, possibly a gate valve, for opening and permitting the material to flow down into the space at the top of the cylinder 4.

Q. These are open only when the closing head is open, isn't that correct?

A. When the closing head is raised above the cylinder?

Q. Yes. A. Yes.

Q. You could not feed liquid  $\text{CO}_2$  into the apparatus successfully through that arrangement, could you?

A. No.

Q. It would be open to the atmosphere?

A. I didn't propose to.



(Testimony of William Howard Clapp)

Q. What would you feed the liquid  $\text{CO}^2$  through into this apparatus?

A. I believe I testified at first that I would put an inlet opening for the liquid  $\text{CO}^2$  above the one shown for the withdrawal of the water. I believe it is marked 36, Fig. 1; [1479] and above the level of the ram, when it is in its lowest position, shown by Fig. 5 in Fig. 1.

Q. As described in this Kochenderfer patent, the top garbage liquid outlet, which carries the legends 30, 31, 32, 33, 34, connects to a common pipe 39, with the bottom garbage liquid outlets 35, 36 and 38, is that correct?

A. That is right.

Q. You couldn't use that common piping system both as an inlet and an outlet, if you were trying to make  $\text{CO}^2$  blocks in this device? A. No.

Q. You would have to change those?

A. Yes, sir.

Q. Are there any other changes that occur to you that you would have to make in this Kochenderfer device in order to use it practically for the manufacture of  $\text{CO}^2$  blocks, or dry ice blocks?

A. I have never seen the machine, and if you could show me the machine I could tell more nearly. I have never seen one of these machines yet, that was built as the drawings in the patent represent.

Q. Do you mean you have never seen any patented machine that corresponds to the patent drawings?

A. Completely, no.

Q. Do you think that is the fault of the inventors or the draftsmen, or the man that makes the machine?  
[1480]

A. It may be my limited experience. I couldn't say.

(Testimony of William Howard Clapp)

The Court: Just blame it onto the lawyers.

A. Thank you, your Honor.

Q. By Mr. L. S. Lyon: Now, will you turn to Slate patent 1,643,590, which is Defendants' Exhibit EE-18. Have you studied the machine and the operation of the machine, as described in this patent, from the standpoint of being able to tell us whether it is operative or not, as described?

A. Yes, I believe it can be made to operate.

Q. But only by the addition of some external source of power, is that your opinion?

A. The patent doesn't state that he relies entirely on the power derived from the expansion of these gases from the liquid, to drive the machine.

Q. That is not my question, Professor. I am sure you did not intend not to answer my question.

A. I said I believe I could make it operate, and I certainly would put a belt drive on that fly-wheel from a motor geared down low.

Q. If you put a belt drive on that fly-wheel would it any longer be a fly-wheel? A. Certainly.

Q. Does the patent state that there is to be any power applied to this fly-wheel from an outside source?

A. No.

Q. But it is your opinion there would have to be some. [1481] is it not?

The Court: Look at page 3, the sentence beginning line 106, and particularly 107 "or whether by other means (not illustrated)". A. Yes.

Mr. Foster: Is that line 107?

The Court: 107, page 3.

A. Which I read into the record, I believe.

(Testimony of William Howard Clapp)

The Court: Did you read that in?     A. Yes.  
[1482]

Q. By the Court: Doesn't that indicate that he did not rely entirely upon the—     A. Yes.

Q. —utilizing the energy from the expansion of gas from the liquid in the compression chamber?

A. Yes. In line 104: "to drive or to continue to drive", from which I take it that he might get some of the energy for operation from the expansion of the gas, liquid to gas, and some from other sources.

Q. He says, "continue to drive." He means he might start up with something else, some other means, and that that might keep it going, doesn't it?

Q. By Mr. L. S. Lyon: Will you refer to the paragraph commencing at line 35 on page 3, the first column, and read that, Professor, and tell us what you understand from that as to how this machine is to be powered?

A. "Another valuable result of the novel method and machine disclosed is that all of the power obtained by the energy exerted on the piston 18 and applied or transmitted through connecting rods and gearing operatively connecting the piston 18 to fly-wheel 52 represents just so many heat units removed from the converting chamber 5, thereby converting a portion of the liquid carbon dioxide to snow and lowering the temperature of the escaping carbon dioxide gas to be used through the heat exchanger conduit 30, which will in turn lower the temperature of the incoming liquid carbon [1483] dioxide in the conduit 31, and make it possible to run the machine at a lower liquid pressure of the carbon dioxide without danger of evaporation in the conduits leading to the machine and of a resultant freezing of ice in these conduits by such conversion."

(Testimony of William Howard Clapp)

Q. Were they not justified in referring to this as a perpetual motion machine if there is no added power applied to the fly-wheel from an external source?

A. Oh, no; it would not be a perpetual motion machine even if they got the whole source from the liquid carbon dioxide and used no power from outside.

Q. Is your answer—

Mr. Foster: Just a moment.

Mr. Miketta: Just a moment. May the witness finish his answer?

Mr. L. S. Lyon: I thought he had finished. He said "No."

Q. Is your answer based on the fact that you would be consuming  $\text{CO}^2$  in the machine?

A. It would be consuming the energy derived from the evaporation of the carbon dioxide to drive the machine.

Q. What determines how much force the piston 18 could exert on the solidified  $\text{CO}^2$  in this operation of this machine as described?

The Witness: May I have that question again, please?

The Court: Yes. I would like to have it, too.

(Question read by the reporter.) [1484]

A. Well, the size of the fly-wheel might be one influence on that for doing work, say, on the upstroke, as shown in Fig. 3, doing work on the bottom of the piston, and as they work down there is a tendency to speed up this jim-crank mechanism shown on Fig. 1. and that means that energy is absorbed by the fly-wheel and the size of the fly-wheel would control the resistance to the operation of the piston.

(Testimony of William Howard Clapp)

Q. What would determine what pressure the bottom closure plate 8 would withstand without opening?

A. There is shown in Fig. 1 a toggle device consisting of two arms, 42 and 43, 42 being pivoted on the frame of the machine by pin 44 and arm 42 (43) being pivoted to the bottom of the bell crank lever 8 by pin 41, these two arms being united at about the middle distance there. I am not certain as to what the pin number is from those Figures. As this toggle is put in the raised position, which takes place when the crank arm No. 39 strikes the spring end 48 of this left-hand lever, the effect is to close the toggle arm and to throw the bottom of the bell crank out and pin 41 toward the right and close the cap.

Q. I think you have described the linkage mechanism but I don't think you have told me what determines how much pressure, internal pressure, this cap 8 will resist without opening.

A. Yes. That is regulated by the screw 46 which acts as [1485] a stop so that we can bring this toggle arm up to any desired position before it stops. Of course, if the line connecting those three pins, that is, if it were to become one line, clear up, why, theoretically an infinite force would be required.

Q. Does the speed of rotation of the fly-wheel or the amount of energy stored in the fly-wheel have anything to do with the pressure that this cap 8 will withstand without opening?

A. No. It is supposed to be adjusted to withstand a certain pressure by bringing these arms as nearly into coincidence as may be desirable. The nearer we bring those three pins into a straight line, the higher the pressure required to open the cap.



(Testimony of William Howard Clapp)

Q. Is the cap 8 opened by the pressure built up by the piston in the cylinder, or is it opened mechanically by a timing arrangement?

A. No; it is opened by the pressure built up by the piston against the ice.

Q. The resistance of this cap 8 is independent entirely of the action of the piston in the chamber throughout its travel, is that correct?

A. Yes. It is set to open when there is a definite pressure.

Q. Do you know what that pressure is, or can you approximate it from your mechanical knowledge? [1486]

A. No. The patent doesn't show what pressure is to be employed.

Q. Do you know what pressures are employed in pressing commercial dry ice blocks, or approximately what they are?

A. Oh, it might be a thousand pounds per square inch.

Q. Do you understand that is about what they are?

A. Somewhere in that neighborhood; yes.

Q. Is this structure shown in this Slate patent, in your opinion as an engineer, adapted to withstand such a pressure? A. I haven't seen the machine.

Q. Would you utilize this design for withstanding a thousand pounds pressure? A. Heavens, no.

Q. How much do you think it would withstand?

A. Why, that would be just a guess and it would not be worth anything. I don't know anything about the sizes or proportions of those parts.

Q. Yes. But, to you as an engineer, they are obviously not designed to withstand high pressures like a

(Testimony of William Howard Clapp)

thousand pounds? I am talking now about the mechanism on which the cap 8 depends.

A. Oh, yes; that could be designed to withstand pressures of 10,000 pounds.

Q. Does it appear to be that to you in this drawing?

A. How is that? [1487]

Q. Does it appear to be so designed in this drawing?

A. Well, as I say, I know nothing of the proportions there.

Q. Doesn't this drawing look to you like a proportionate drawing? It may not have any scale on it, or doesn't look like a drawing from an actual machine?

A. No.

Q. Maybe we can shorten this up, Professor. In your opinion, if you have one, could you manufacture dry ice blocks of commercial size practically in the machine of this Slate patent?

A. I believe I could.

Q. Do you think you could? A. I believe so.

Q. Did you ever try it? A. No.

Q. Did you ever see such a device? A. No.

Q. Would you recommend this as a design?

A. No.

Q. Why not?

A. Well, there is a lot of unnecessary cranks and levers and things there for what thing you wish to accomplish. An engineer tries to go to the result he wishes to get in the simplest and most direct way possible.

Q. And you would not use this Slate design if you were [1488] trying to do that, would you?

A. Outside of the cylinder, it is my opinion that the cylinder and piston and what takes place there, and the cap—it is my opinion that the same result could be gotten much more simply and effectively.

(Testimony of William Howard Clapp)

Q. Let us confine ourselves then to what is shown on the third sheet of the drawings. That is what you include in your last answer and that eliminates what you say you would reject, isn't that correct?

A. You want me to re-design the machine?

Q. Oh, no. I want you to tell us whether you would have to re-design this machine if you were going to recommend it for the practical manufacture of dry ice blocks.

Mr. Foster: Which is objected to as immaterial as to the recommendation. He has testified as to the possibilities.

The Court: Well, I think the form of the question may be unfortunate. As I understand it, Professor, the question is this: Take Figs. 5 to 8, both inclusive, of this Slate patent '590; what changes would you have to make in those pieces of apparatus in order to use it commercially for making dry ice? A. Figs. 5 to 8?

The Court: That is what I understood by your question.

Mr. L. S. Lyon: Yes; that is correct, your Honor.

A. Well, nothing is shown in Figs. 5 to 8 as to how the closure cap is to be opened under pressure. [1489]

The Court: That is right. You would have to supply something to take care of that, or abandon it, wouldn't you?

A. Yes, sir. The patent discloses that other means may be employed to lower the pressure along the line of stroke other than the outlet 28, and such other means might be desirable.

(Testimony of William Howard Clapp)

Q. By Mr. L. S. Lyon: You think it would be desirable to have some kind of a closure at the top of the chamber?

A. No; because the patent discloses that the piston makes a sealed connection when the cap is closed, so that this position between the piston and the cap is a closed chamber.

Q. You have heard the testimony here that in the Cole and McLaren patent press or apparatus and in the defendants' apparatus it is necessary to allow a clearance around the piston; have you heard that testimony?

A. I have not heard any of the testimony on the patent in suit.

Q. What is your understanding as to the Cole and McLaren patent as to the plunger in Fig. 5; do you understand that there must be a clearance around that plunger for the passage of gas?

The Court: Here it is right here (indicating exhibit).

A. In the description of the patent under the modified apparatus shown in Figs. 5 and 6, this plunger fits loosely in chamber 100 to permit gases to pass as it descends.  
[1490]

Q. By Mr. L. S. Lyon: Have you sufficient knowledge to tell us of what importance that is in the practical operation of the machine?

A. I think I should have made that clear when I stated in the Slate patent that other means for escape of gas should be provided.

Q. You would have to have some outlet for gas somewhere between the closure head 8 and the piston, would you not, to operate the Slate device satisfactorily?

A. During the compression stroke of the piston?

(Testimony of William Howard Clapp)

Q. Yes. A. Yes.

Q. What kind of a device would you have that would be an opening or a vent during the compression stroke and yet would not be a vent during the time the CO<sup>2</sup> is propelling that piston upward in the chamber in the Slate patent?

A. He evidently had in mind, I gathered, a multitude or a number of port openings along the wall of the cylinder.

Q. You would not want the chamber vented to the atmosphere during the operation on which the expansion of the CO<sup>2</sup> is driving the piston upward, would you, in this Slate device; you could not put up with that?

A. No; not vented to the atmosphere.

Q. You would not want any vent at all if you were going to use the energy of the expanded gases to drive the piston up, isn't that correct? [1491]

A. Well, there would be that much less, that much less or lower pressure, perhaps, on the piston. It would depend on the pressure in the exit source there for those gases.

Q. I understand your testimony quite correctly, in my opinion, saying you have got to put some kind of a vent between that closure head 8 and that piston to relieve the chamber of gases during the pressing? A. Yes.

Q. What I can't understand is how you are going to have it in there and not lose your gas at that vent when you are trying to drive the piston up with those gases. Can you tell me that?

A. Well, it might be a valve which would be closed on the upstroke and open on the downstroke.

Q. There is no such thing described in this Slate patent? A. No. It says "other means".



(Testimony of William Howard Clapp)

Q. Does it say there is to be any other means down below the level of the openings 28, anywhere in the patent?

The Witness: I have lost my patent now.

Mr. L. S. Lyon: Well, I have lost mine two or three times.

The Court: 18.

The Witness: This was the British Slate, wasn't it?

Mr. Foster: No. This was the U. S. Slate, 1,643,590. I believe, that Mr. Lyon was inquiring about.

The Witness: I am sorry. [1492]

Mr. L. S. Lyon: It is Exhibit EE-18, Doctor, if you have yours numbered that way. I can show you.

Mr. Foster: No. He doesn't have the tab numbers, Mr. Lyon.

A. Yes; I have read that paragraph.

Mr. Foster: Could the witness point out what he is referring to in the answer for the purpose of the record?

A. Commencing with line 96 on page 3: "The phrase 'reducing pressure in the chamber' as used in the succeeding claims is to be construed broadly as applying to any operative method and means for relieving or reducing the pressure on liquid carbon dioxide supplied to a chamber under pressure, whether by utilizing the energy of the expansion of gas from the liquid in a pressure chamber to drive or to continue to drive a movable element such as a piston and thus increase the capacity of such a chamber or whether by other means (not illustrated) for releasing or reducing pressure in the chamber into which the liquid carbon dioxide is conducted under pressure, such as a valve controlled passage adapted to be opened to allow the portion of the liquid carbon dioxide which vaporizes to escape rapidly from the chamber while the remaining portion is refrigerated to snow."

(Testimony of William Howard Clapp)

Q. By Mr. L. S. Lyon: That clause is referring to the operation during snowing, is it not, and not during the pressing? [1493]

A. The patent does not state so.

Q. I thought it did, when it says "while the remaining portion is refrigerated to snow." Isn't that speaking of the snowing stage?

A. Yes. Those openings, hypothetical openings are certainly working when the snowing operation is going on. That would be during the upstroke of the piston.

Q. And it don't say where they are in this patent?

A. No, no.

Q. And there isn't any statement in the patent that there is to be any vent for the gas between the piston and the chamber closure plate 8 during the pressing operation, is that correct?

A. No; the patent does not specifically state where those openings are to be placed.

Q. Professor, as a mechanical engineer, could you approve attempting to operate an apparatus for manufacturing solid CO<sup>2</sup> blocks with a piston moving in a cylinder such as shown in this Slate patent with the piston in sealing-tight contact with the inner wall of the chamber?

A. I would have to see the provision that was made following the description given in the lines which we have just read before I gave approval to it.

Q. There would be a tendency in an apparatus of this kind when the plate 8 was open at the bottom and atmosphere could gain access to the inner side of the chamber for [1494] moisture to condense and freeze on the inner wall of the chamber, would there not?

A. As I gather your question, you are referring to the moisture coming in at the top of the cylinder?

(Testimony of William Howard Clapp)

Q. No; at the bottom, at the bottom when you open the plate 8. There would be some moisture, some air, and almost all air excepting maybe in some parts of San Diego County carry moisture?

A. Yes; there would be that tendency.

Q. And, as a mechanical engineer, how long do you say the piston could operate under those conditions and maintain its sealing contact with the wall of the chamber? Wouldn't it wear out?

A. Steam engines run for years with moisture around the piston without any attention to the rings.

Q. There would also be the moisture, this same moisture at the top of the piston and following the piston down there would be air admitted to the chamber, would there not?

A. Yes, sir.

Q. I am going to ask you one question and if you can't answer it, perhaps you would make a calculation for us tonight. I will ask you if you have made any calculation to determine how tall this Slate device would have to be to operate theoretically as described in the patent and without any added source of power; and I will give you a suggested answer: 240 feet high, and ask you if you can make the [1495] calculation and tell us whether that is right or not in the morning.

Mr. Foster: Well, that is objected to, your Honor, as being a hypothetical question and having no true basis of fact, because, as Professor Clapp has pointed out, the patent states that it can rely, or the patent does not state that it relies entirely upon the expansion of gas for its energy.

The Court: If counsel wants the Professor to make any calculations, he can make him his witness and pay him for it, otherwise he does not have to do it.

(Testimony of William Howard Clapp)

Mr. L. S. Lyon: I know he doesn't have to, but I thought maybe he would.

The Court: That is up to him.

The Witness: If you will give me some figures on the friction in the mechanism, and the diameter of the piston, etc., conditions under which the liquid is let in, I think I could make some calculations that might be approximately correct.

Q. By Mr. L. S. Lyon: Can you state—

The Court: Let us call it a day. I think it is about time. We will adjourn until 10:00 o'clock tomorrow morning.

(Whereupon an adjournment was taken until 10:00 o'clock a. m. the following day, Thursday, May 25, 1944.)  
[1496]

Los Angeles, California, Thursday, May 25, 1944;  
10:00 a. m.

(Parties present as last noted.)

The Court: You may proceed.

WILLIAM HOWARD CLAPP,

recalled.

Cross-Examination

resumed.

Q. By Mr. L. S. Lyon: Professor, taking up again this Slate patent No. 1,643,590 which we were discussing at the adjournment last night, the intended operation of the apparatus as shown and described in that patent is that a block shall be completed for each cycle of the piston; is that not correct?

A. One would infer it from the illustrations, but I do not recall that statement in the text.

(Testimony of William Howard Clapp)

Q. What is your understanding of the operation intended by the patent in that respect?

A. My understanding is that we have an injection period during the upstroke of the piston, snowing in the chamber during the upstroke, escape of the carbon dioxide gas, and compression of the snow on the downward stroke and ejection of the snow. [1497]

\* \* \* \* \*

Mr. L. S. Lyon: I did not intend to quote his testimony. What I am asking the witness to answer is, that assuming there is no belt applying power to the so-called fly-wheel, the energy to drive the piston to compress the solidified CO<sub>2</sub> must come from the momentum of the fly-wheel, is that correct?

The Court: I think that question is perfectly proper.

A. Yes, sir. Yes, sir; it is correct.

The Court: Let me call your attention, Professor, to page 3 in connection with that last question, page 3. line 60: "The piston 18 when in the position shown in Fig. 7 is ready to start on its return or downward stroke and continue downward driven by the force of the energy stored in the fly-wheel 52, to about the position shown in Fig. 8. At this [1499] stage of the operation of the machine the pressure of the compressed cake of solid carbon dioxide on sealing cap 12 and cap applying member 8 will throw the toggle joint 54 of members 42 and 43 off center and discharge the compressed cake of carbon dioxide as shown in Fig. 5. The process and cycle of operation above described will then be repeated, with a resultant compression of carbon dioxide snow into a compact solid mass which is ejected from the converting chamber at the end of each cycle."



(Testimony of William Howard Clapp)

A. Yes; it does say "at the end of each cycle." I stand corrected, sir.

Q. By Mr. L. S. Lyon: Based on your engineering knowledge, Professor, can you tell us how many cycles per minute, or approximate the number of cycles per minute or per hour at which this device could function or would function?

A. No; it would be—there are too many variables. The rate of evaporation of liquid CO<sub>2</sub>, the rate of injection of liquid CO<sub>2</sub>, the friction in all of this linkage, would be factors influencing the rate of travel of the piston.

Q. Have you answered the question?

A. Yes, sir.

Q. Assuming a block of a height of 10 inches, and a temperature for the liquid CO<sub>2</sub> of approximately minus 50 degrees of the liquid CO<sub>2</sub> in the feed into the device, what would the cycle rate be in this machine, or approximately what would it be? [1500]

Mr. Foster: I object to the question as vague and indefinite, your Honor, in that there are factors mentioned by the witness, which are not contemplated by this question.

The Court: I don't think that question, hypothetical or otherwise, has to include all of the elements. If you can't answer as to the rest of them, you just say so.

A. We are injecting a certain amount of liquid carbon dioxide at minus 50 degrees?

Q. By Mr. L. S. Lyon: CO<sub>2</sub> at minus 50 degrees.

A. That would be a gas then.

Q. Liquid CO<sub>2</sub>? A. Not minus 50 degrees.

(Testimony of William Howard Clapp)

Q. At a temperature of minus 50 degrees?

A. It would depend upon the pressure conditions, yes, that is right. I stand corrected.

Q. That is, as I understand, the ordinary commercial temperature for liquid CO<sub>2</sub> that is fed into commercial machines, where the temperature of the liquid is about minus 50 degrees? A. Yes.

Q. I am assuming that temperature of the liquid CO<sub>2</sub>.

A. That would correspond, perhaps, to a pressure at injection of several hundred pounds, maybe.

Q. You can assume that the block that is going to be made is, say, 10 inches high. Can you approximate the cycle rate that the machine would have to function at? [1501] A. No.

Mr. Miketta: I object to the question as incomplete. The height of the block is given, but not its diameter. No basis of measurement exists for the assumption.

Mr. L. S. Lyon: I think the Professor would agree that Mr. Miketta would have to flunk his course in mechanics. I don't think the area of the block would make any difference.

The Court: It is completed at every cycle. For the purpose of the question I don't think it would make much difference. You may answer, if you can.

A. The pressure on the piston is going to depend upon the area of the piston, and then the rate at which it moves is going to be controlled by the weight of the parts to be lifted, by the friction in the mechanism, but probably most of all, by the weight of that fly-wheel, its moment of inertia, and resistance that it gives to accelerating under the applied force under the piston.

Q. By Mr. L. S. Lyon: Perhaps we can get at it this way: You are asked to lay out this machine so as

(Testimony of William Howard Clapp)

to make a block 10 inches deep, and for that matter, let us say 10 inches across; it is square. You would have to start somewhere, and you would have to decide what weight would be in the fly-wheel, wouldn't you, for one thing? [1502] A. That would be one thing.

Q. What do you think, as a designer, the weight of that fly-wheel should be to make that block in that machine?

A. That would depend entirely upon what rate you wished this piece of apparatus to travel at.

Q. At what rate do you think you could design it at to travel satisfactorily, if at all?

A. I think that is asking a great deal of me. Certainly, to perform its functions it should travel quite slowly. Anything I give would be just a guess. I don't think it would be worth anything.

Q. Do you think it would be one revolution per minute, or one revolution per hour, or what is your best guess?

Mr. Miketta: If the court please, I think this line of questions has gone far enough. The validity of the Slate patent is not before your Honor. The only patent whose validity is in question is that of the patent in suit. The prior patent shows a certain structure. That structure, as it pertains to the claims and the subject matter before your Honor is of interest, but the validity of the Slate patent is not in issue.

The Court: I don't believe the objection is sound. I think the question is proper from that standpoint, but I think it is surplusage, because he has already said it would be a pure guess. Why should we bother with conjecture?

(Testimony of William Howard Clapp)

Once an hour wouldn't be any better than once a [1503] minute.

Mr. L. S. Lyon: I am inclined to agree with your Honor.

Q. Can you tell us how high you would design this chamber to make such a block in this machine?

A. Oh, judging by the proportions shown here in Figure 1, and assuming that you had a 10-inch square cylinder area, perhaps 8 or 9 or 10 feet high.

Q. Are you prepared to state that with the chamber only 9 or 10 feet high such a block could be produced in this machine? A. No, I don't know.

Q. I am told that the chamber would have to be 240 feet high to make such a block. Do you know whether that is right or not?

A. I think it is based on a whole lot of assumptions. No, I would not be prepared to believe it at all.

Q. Do you know it's wrong?

A. It depends on your assumptions.

Q. I am assuming a 10-inch block in height, and liquid fed at minus 50 degrees, and a proper-sized fly-wheel, are you prepared to say that I am wrong when I say the height of the chamber would have to be approximately 240 feet? A. I would have to be shown, sir.

Q. Are you prepared to say that the statement is wrong? If you are not prepared one way or the other, that [1504] is all I want to know.

A. I think it could be 240 feet, or it might be 120 feet or even less.

Q. You don't know what it would be?

A. No, I don't grant that there is any fixed height there.



(Testimony of William Howard Clapp)

Q. What effect does the height of that chamber have on the operation?

A. I think I see what you are getting at. We are letting in enough liquid so that when it boils we must have room enough to hold the gas that is evolved at such pressure, at the upward stroke. Supposing that the gas was not exhausted until the piston had reached the limits of its stroke. That pressure would vary all the way. It would be dependent very much upon the size of the fly-wheel. It would not be a uniform pressure. We would be having variable acceleration. It is quite a complicated problem; a whole lot of hypotheses in here that makes the whole thing seem to me rather ridiculous, Mr. Lyon.

Q. What is ridiculous? The scheme in that patent is ridiculous, isn't it, from an engineering standpoint?

A. I said yesterday I thought the same results could be accomplished in a simpler, more direct manner.

Q. When you consider these factors we are considering here now, it becomes apparent to you, as an engineer, that the proposal in this Slate patent is a ridiculous proposal, [1505] on the assumption that the energy to drive the piston down to compress the snow must be derived from the momentum of the fly-wheel; isn't that correct?

A. I think you are putting words into my mouth.

Q. I am willing to do that, if you will accept them.

The Court: Read the question.

(Question read by the reporter.)

The Court: Interpreting the word "ridiculous" to be impractical from an engineering standpoint, you may answer.

A. Yes. Your assumption would have no belt drive?



(Testimony of William Howard Clapp)

The Court: Yes.

A. Yes, I think it would be ridiculous.

The Court: One further question: If you were starting out to build a device, back in the early twenties, and had these various disclosures in the prior art, you would not pay much attention to this particular device, if you were going to build a machine?

A. I would not give it a second glance.

The Court: That is about what I thought. [1506]

Q. By Mr. L. S. Lyon: Will you turn now to the patent to Josephson, No. 1,659,431, No. EE-19? This apparatus is specially designed for producing solidified CO<sub>2</sub> by the application of external refrigeration as distinguished from the self-evaporative method, isn't that correct?

A. The apparatus is designed to freeze liquid carbon dioxide from liquid to solid without evaporation to snow.

Q. What would you have to do to this apparatus if you wanted to use it to produce solid CO<sub>2</sub> by the evaporative method?

A. Well, one would run into these tanks through line 40 and valve 40a a certain amount of liquid carbon dioxide. He would then close those valves and open the exhaust valve 51, I believe it is, with outlet on pipe 53, and while that gas is supposed to go back into the system, there is no definite showing as to just how it goes back. It could be exhausted to the air, of course. We would then snow in that chamber. Does that answer the question?

Q. What parts would you have to remove or get out of the way for such an operation?

A. I don't see that you would have to remove anything.

(Testimony of William Howard Clapp)

Q. In this apparatus as it is shown in the patent drawing and described in this Josephson patent, the gas outlet does not function to withdraw gas while converting from liquid to solid CO<sub>2</sub>; that is correct, isn't it?

The Witness: Would you read the question, please?  
[1507]

(Question read by the reporter.)

The Witness: "while converting" what?

(Last part of the question again read by the reporter.)

A. In the normal operation of the device the cylinder 41 is filled with liquid CO<sub>2</sub>, with the valve 51 open. so that the gas can escape, and then valve 51 is closed and—

Q. And while the freezing is going on in the intended operation of this patent there is no gas being withdrawn; that is correct, isn't it?

The Witness: What being withdrawn?

The Reporter: Gas being withdrawn.

A. During the freezing operation; that is correct.

Q. By Mr. L. S. Lyon: And this arrangement in this patent is not so designed as to permit a gas withdrawal during a snowing operation; it would have to be modified and changed; that is correct, isn't it?

A. No; I don't see that any modification would have to be made in the pipes and valves. There would be a modification in their operation.

Q. What would you have to change?

A. I have already stated how one might inject liquid carbon dioxide and produce CO<sub>2</sub> snow in the chamber by the operation of the valves.

Q. Have you any knowledge or experience, Professor, with apparatus in which liquid CO<sub>2</sub> is solidified by freez-

(Testimony of William Howard Clapp)

ing, such as the type of operation described and proposed in this patent? [1508]      A. No, sir.

Q. You never saw an apparatus designed to operate in that way commercially?      A. No, sir.

Q. Are you able to tell us, based on your engineering knowledge, within what range of dimensions this device would be built for practical operation?

A. I should say that those cylinders should be such that we could freeze ice blocks of the size required in commerce.

Q. In a practical operation how would these blocks be removed from these cylinders or chambers according to this patent?

A. According to this patent the walls are made slightly tapering, we have a quickly removable cover, breech-block type, and it is entirely possible to put a little pressure on top of the block through the inlet valve 40a, if necessary, to shove out the block.

Q. What size or dimension of block do you think you could produce or handle practically in that way, do you know?

A. I don't think there would be much of any limit. You certainly could make a 10 x 10 block in there if you wished.

Q. And you would have no difficulty in removing it?

A. No; I don't see why.

Q. You have stated on your direct examination that a plunger might be added to this device. Will you consider now [1509] the position of the inlet and the outlet as shown in the device and tell us if such would not have to be modified if you attempted to add a plunger?